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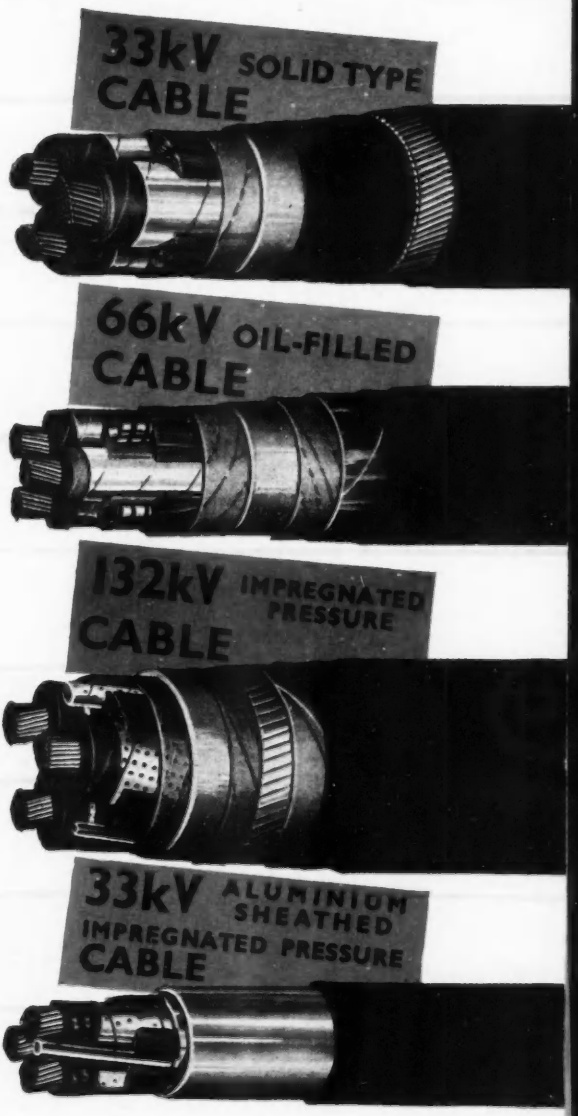
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*THE "THREE-FOLD" RANGE THAT CAN SAVE YOU POUNDS AND POUNDS THROUGH INTERCHANGEABILITY

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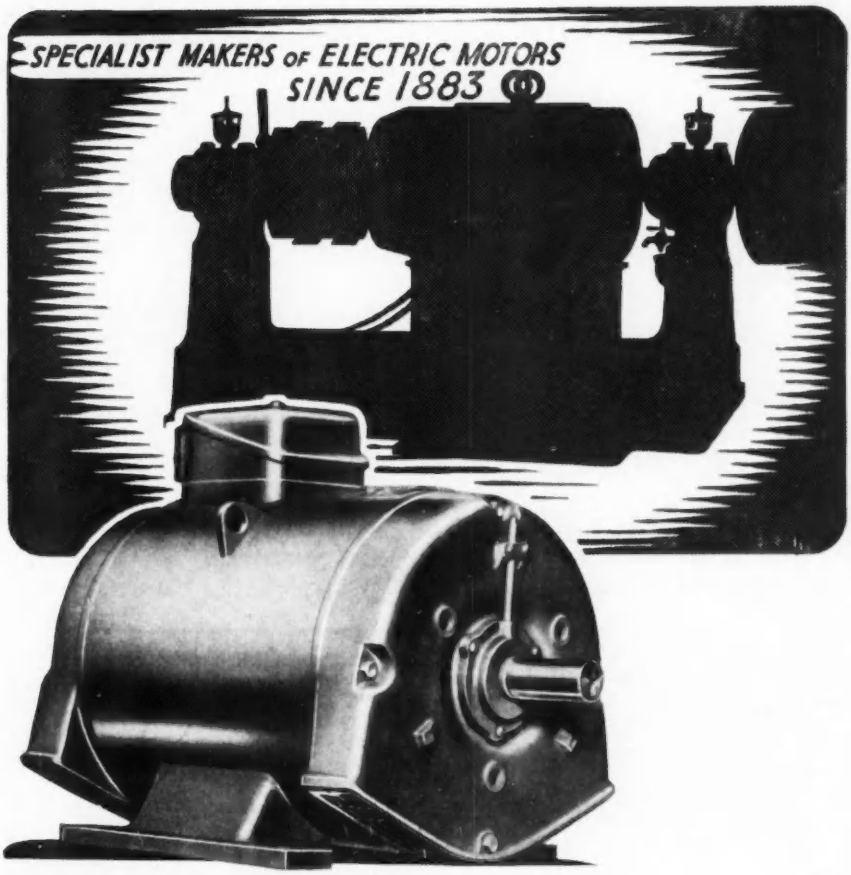

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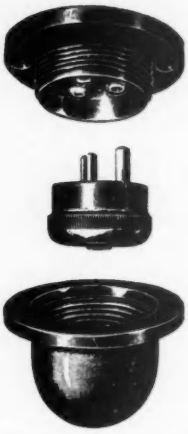

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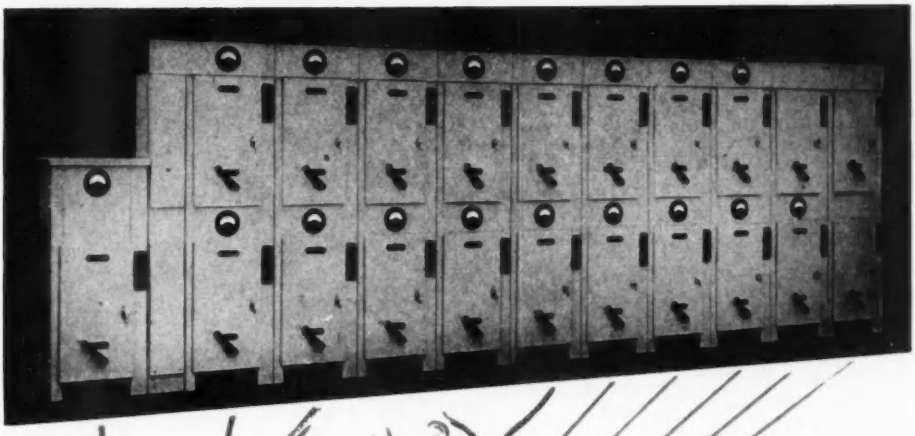

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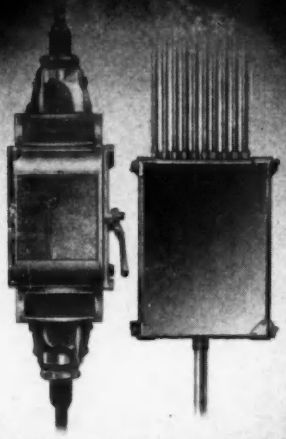

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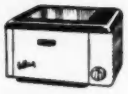

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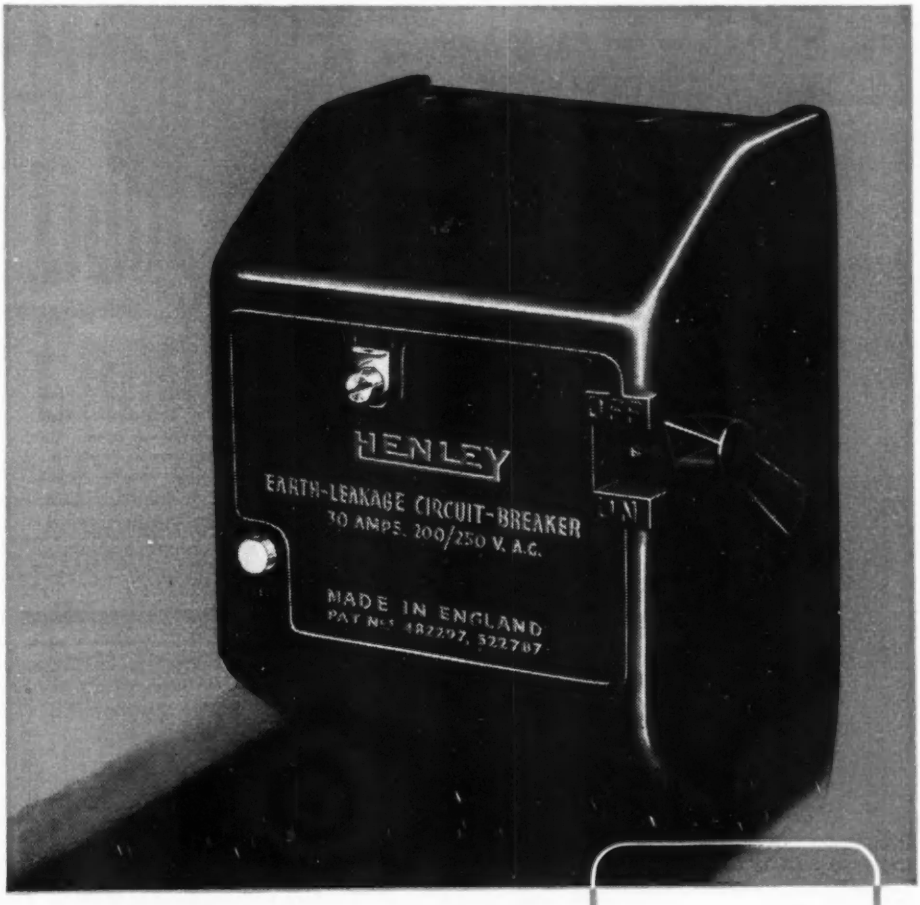

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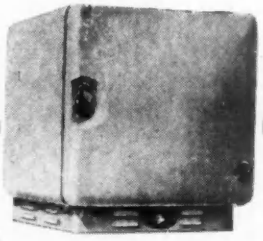

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Astral measures only 24¼ ins. x 22¾ ins. x 21¼ ins.; weighs approximately 65 lbs.; has no motor, no moving parts to go wrong; is completely silent and does not interfere with Radio or T.V.; stores enough for the average family and makes ice cubes. The Astral guarantee is available to every purchaser who registers the refrigerator under the guarantee scheme.

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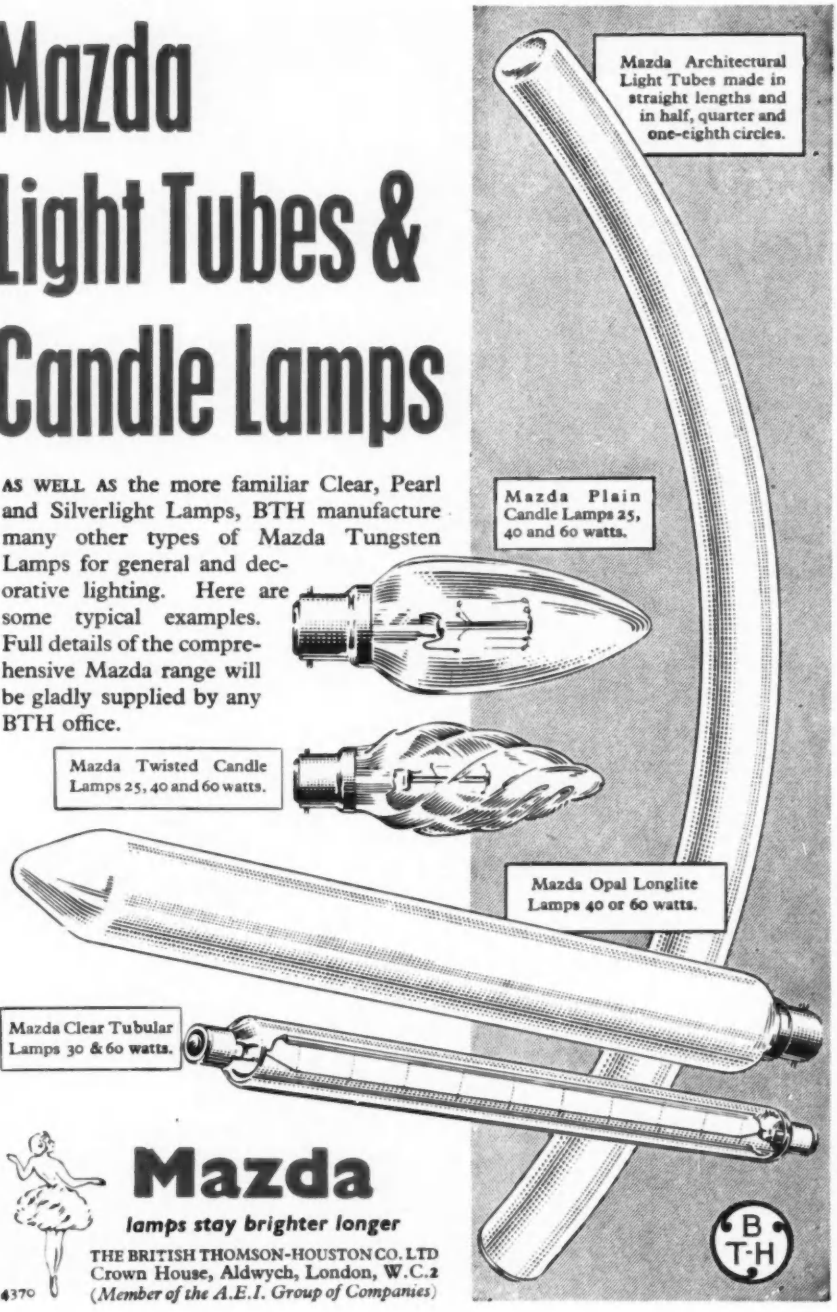
AS WELL AS the more familiar Clear, Pearl and Silverlight Lamps, BTH manufacture many other types of Mazda Tungsten Lamps for general and decorative lighting. Here are some typical examples. Full details of the comprehensive Mazda range will be gladly supplied by any BTH office.


Mazda Architectural Light Tubes made in straight lengths and in half, quarter and one-eighth circles.
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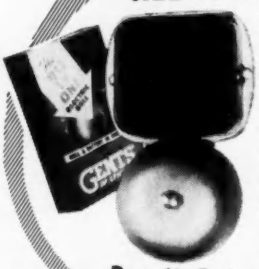

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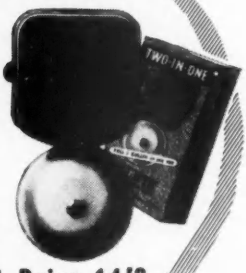
A "ring" and a "buzz" from the same unit. Ideal for distinguishing between, e.g. front and back doors, or two separate offices. Easily installed, operated direct from A.C. mains through a separate transformer.



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'UNDERDOME'

A bell that is different. The space under the dome houses all working parts. Supplied with either 3-in. or 4-in. dome.

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A.C./D.C. 3-4½ volts.

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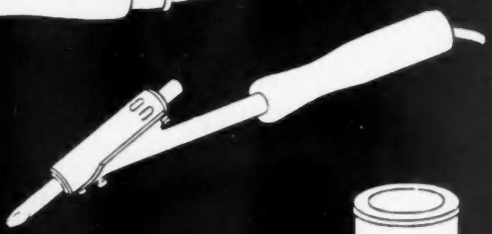
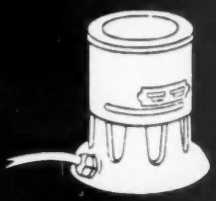
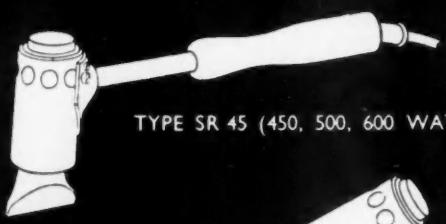


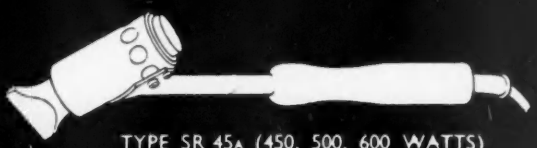
MP 10 (100 watts)



MP 30 (300 watts)



TYPE SR 45 (450, 500, 600 WATTS)



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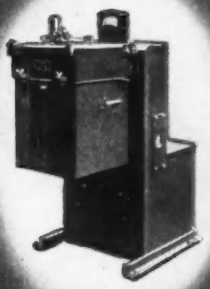
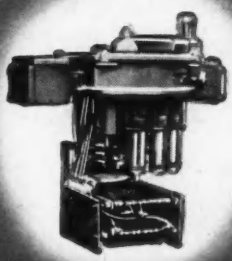
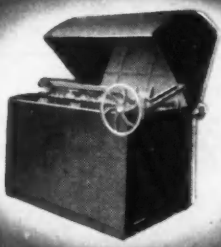


No. 2. Size Stator and Rotor Starter



No. 1 Size Stator and Rotor Starter with tank removed



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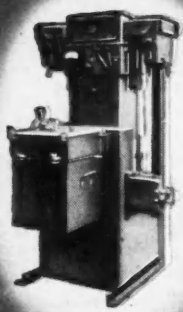

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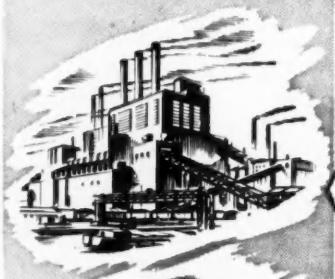

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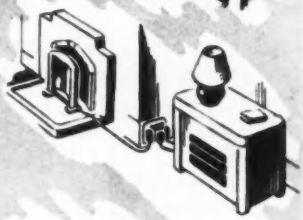

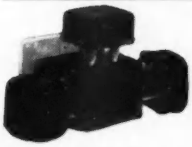

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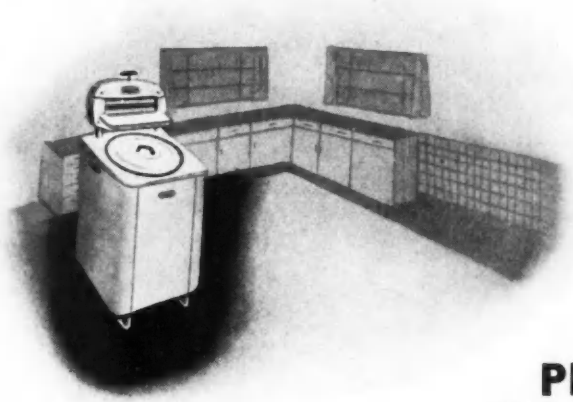

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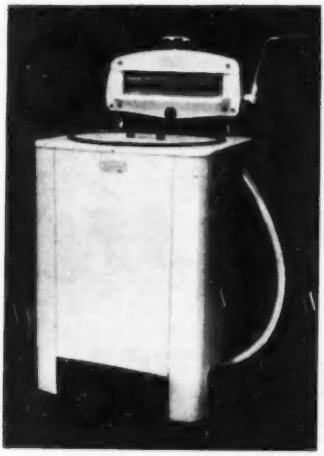

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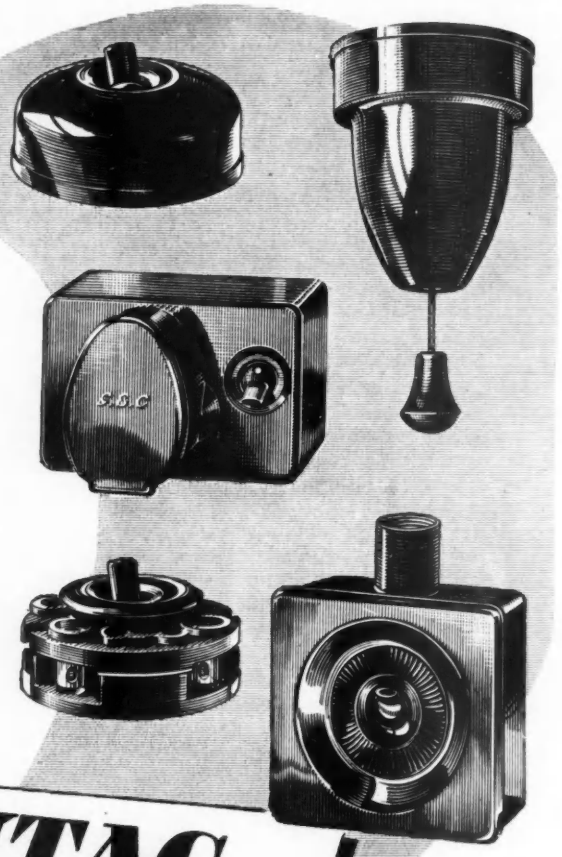

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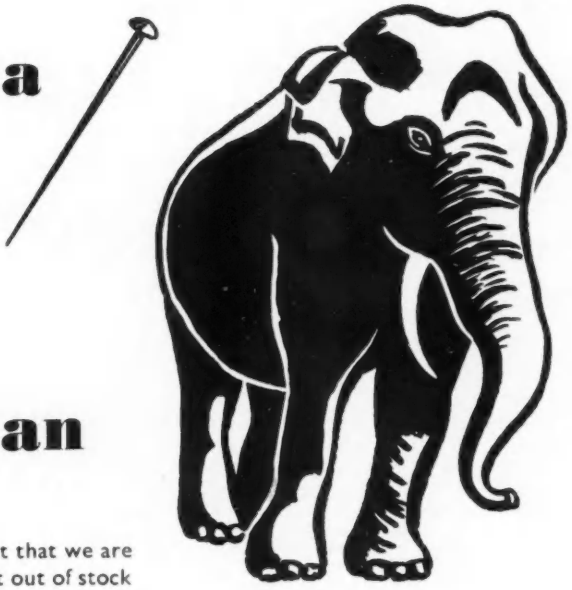

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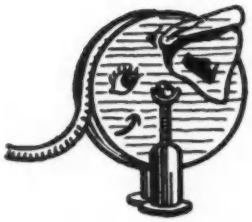

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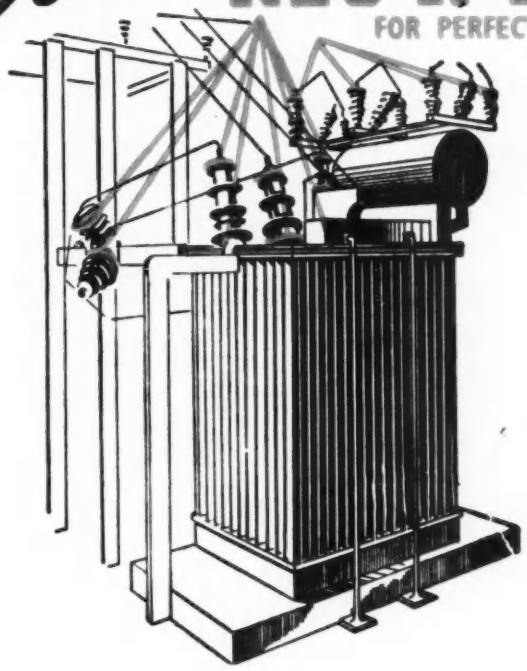

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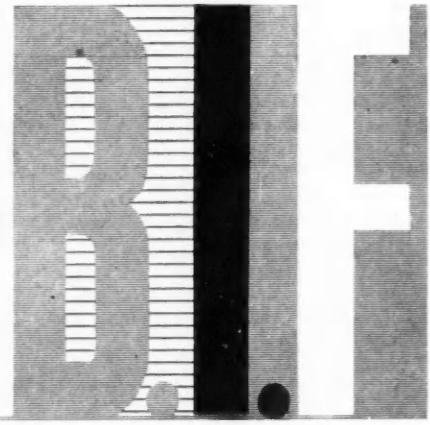

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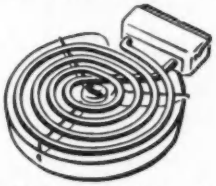

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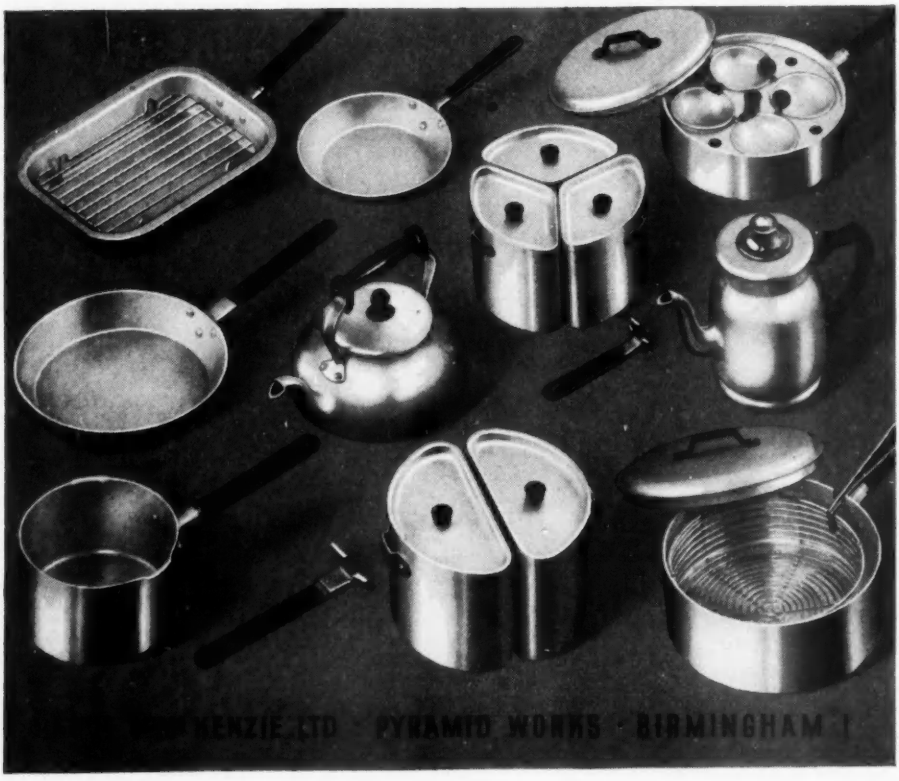

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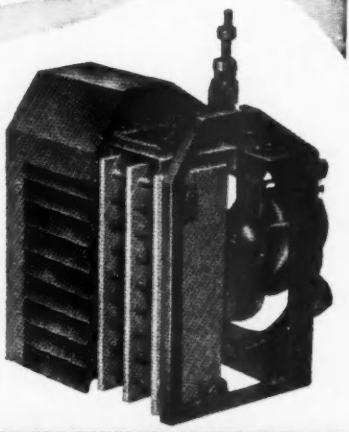

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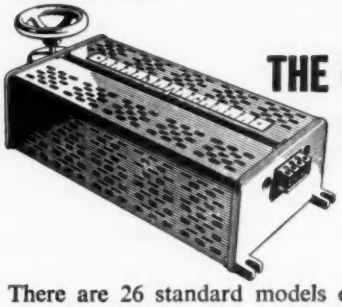

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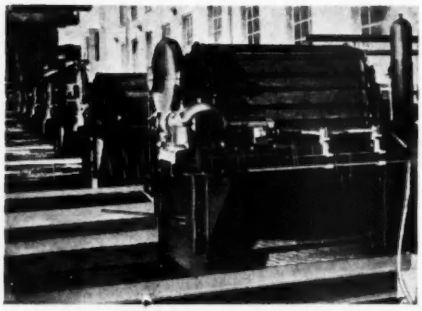

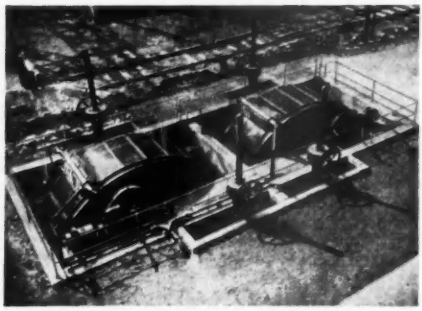

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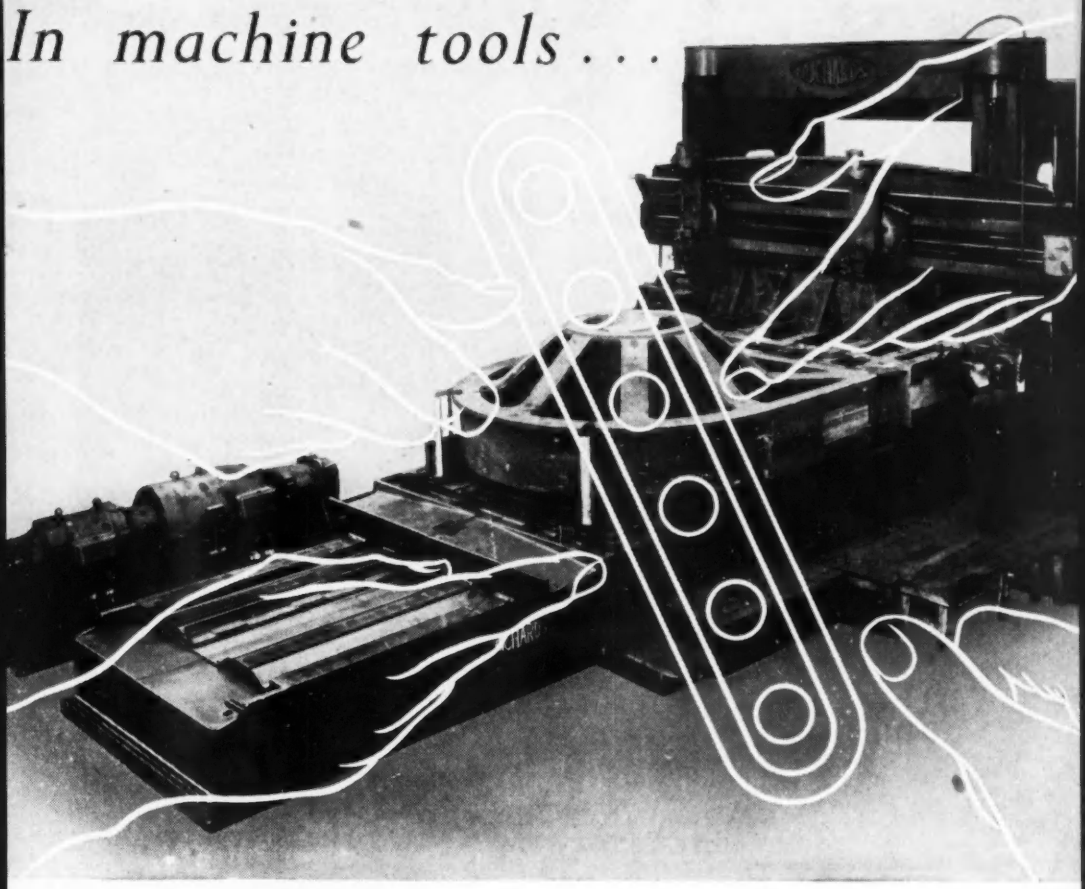

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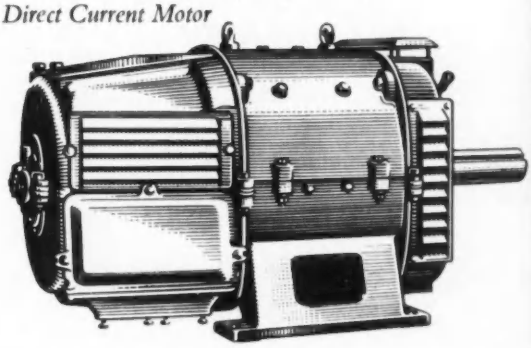

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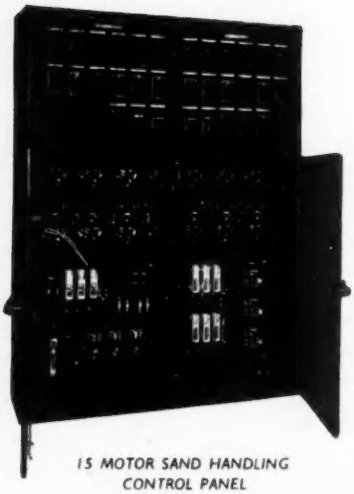

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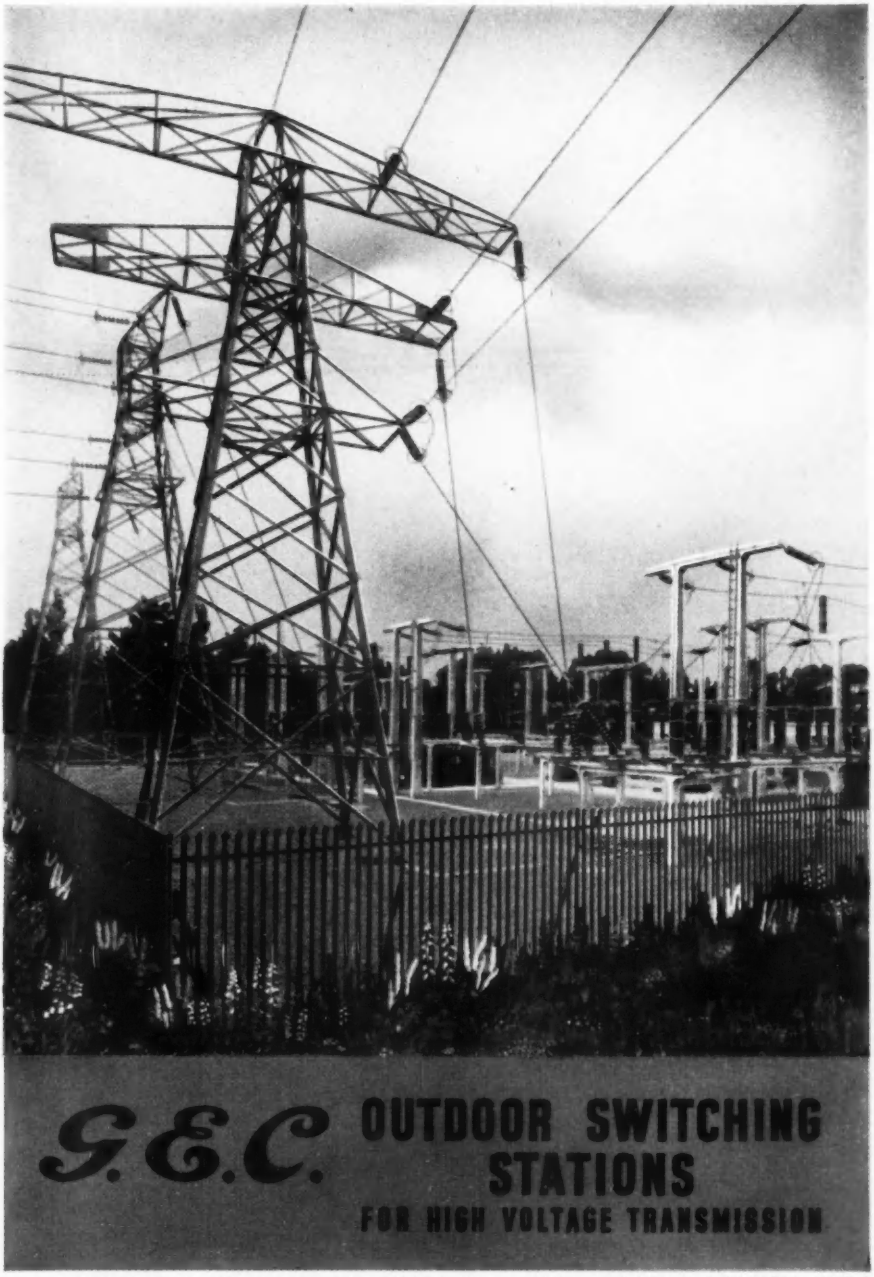

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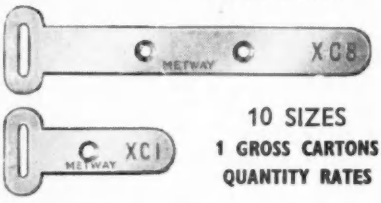

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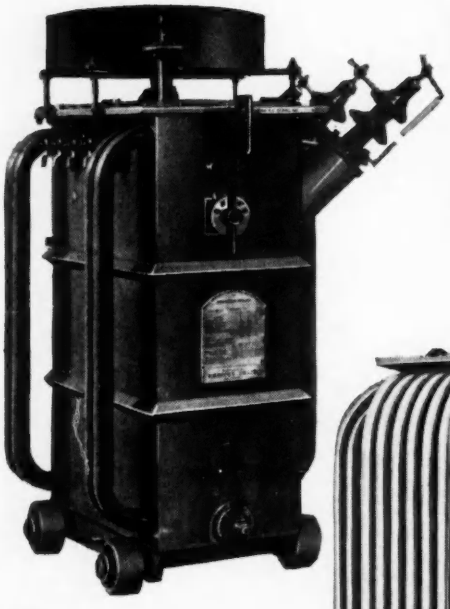

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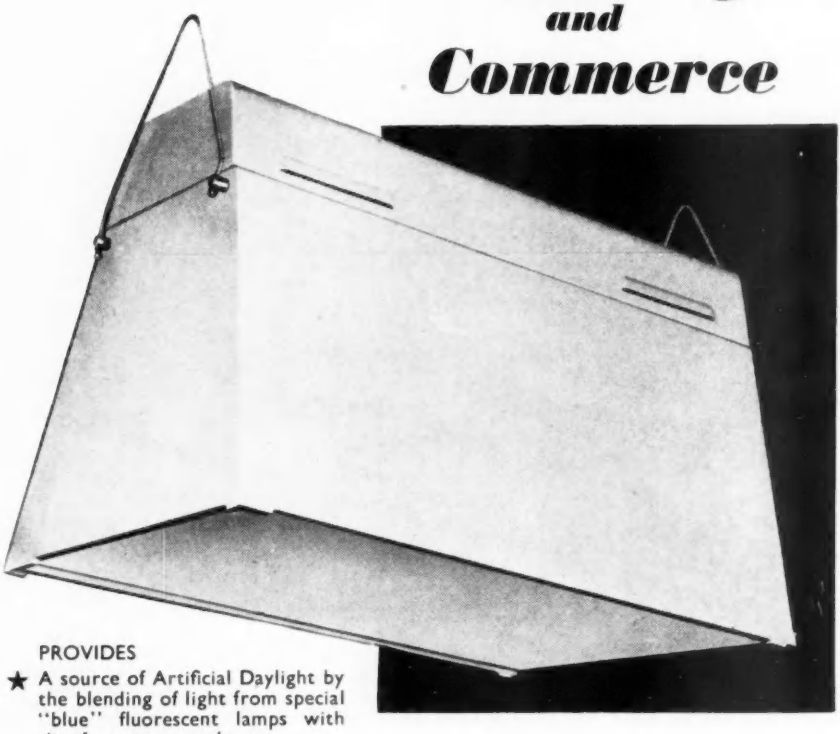

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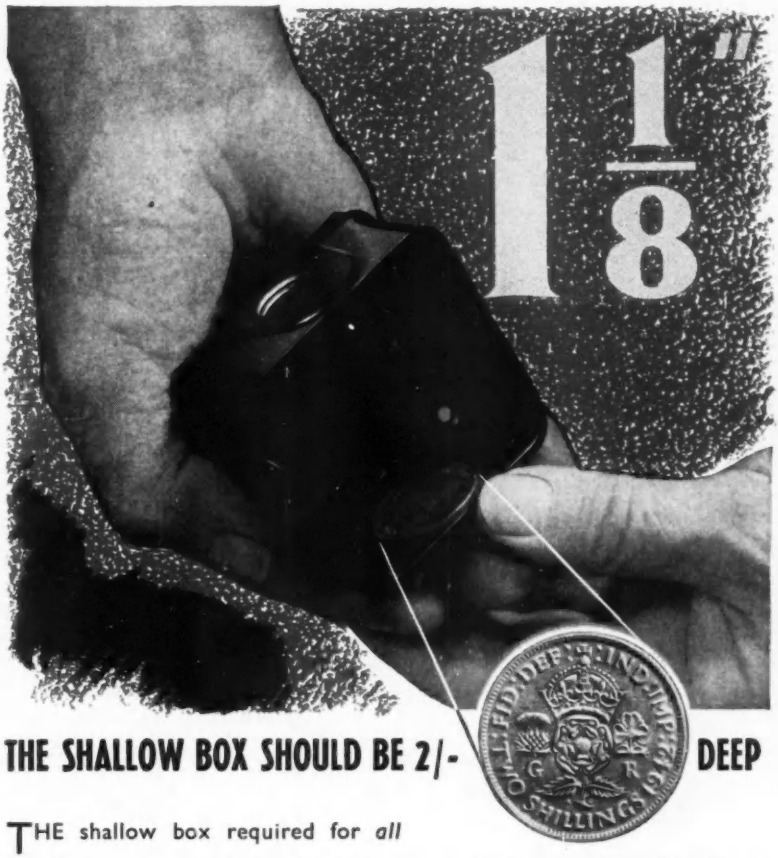

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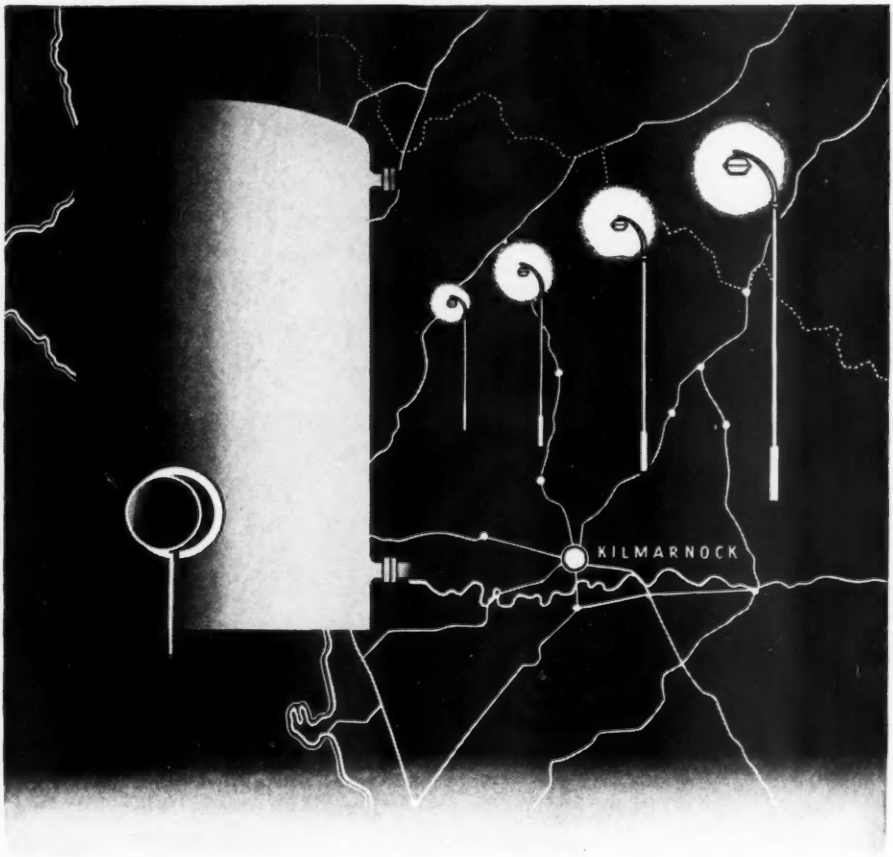

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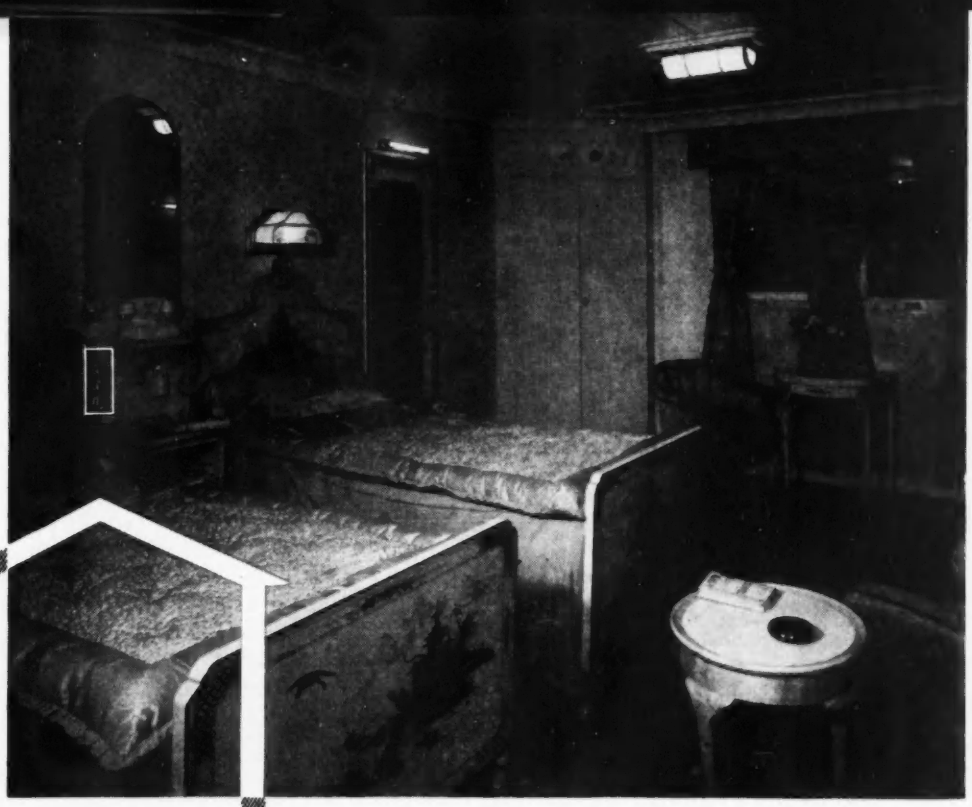

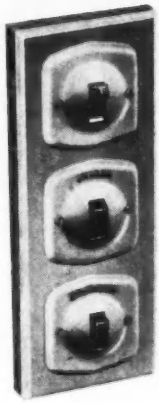

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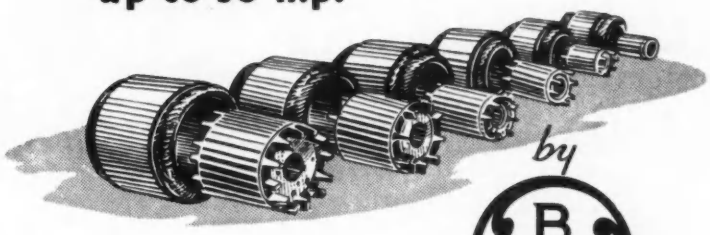

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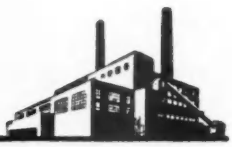

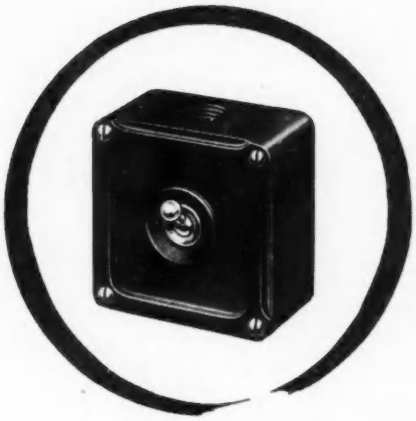

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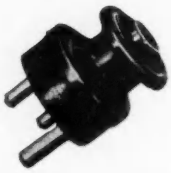

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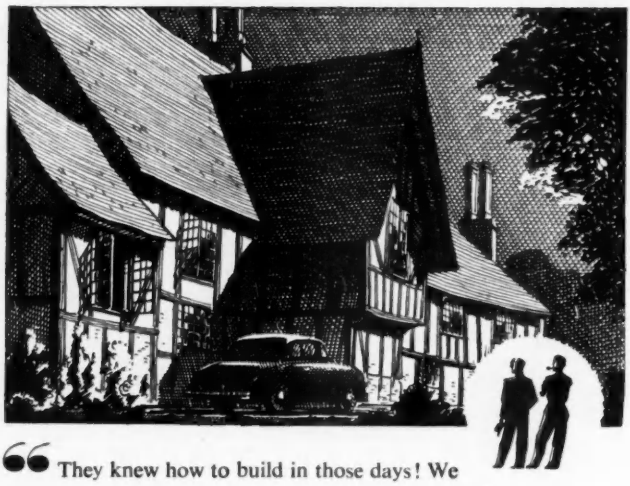

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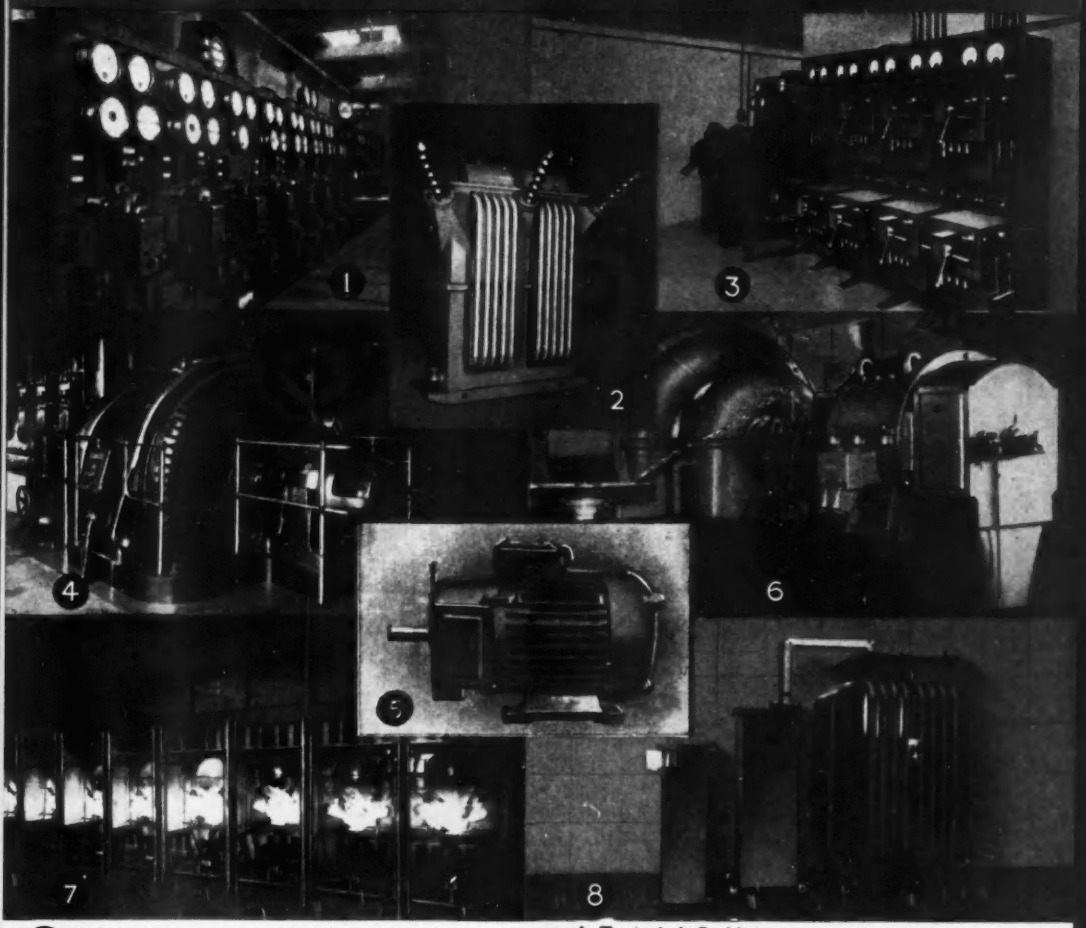

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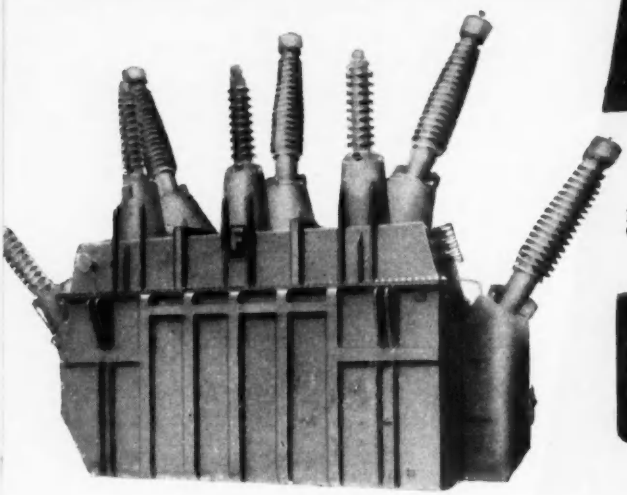

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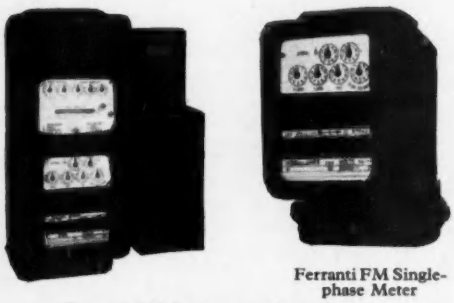

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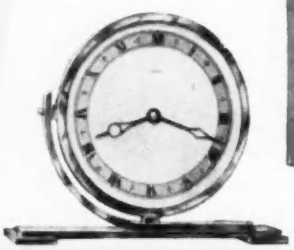

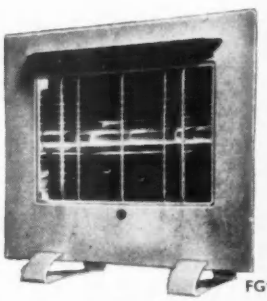

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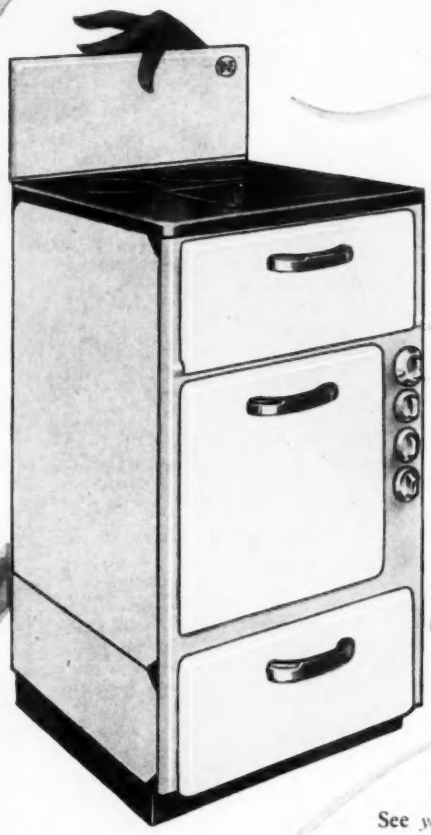

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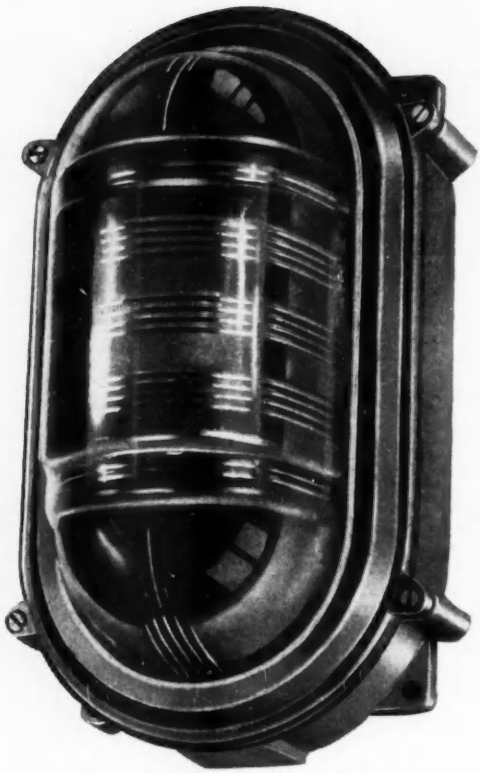

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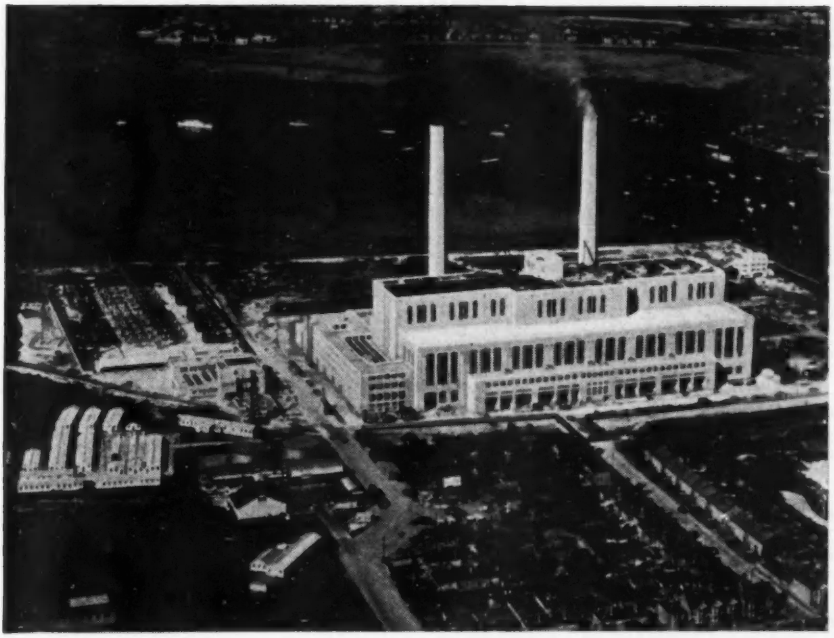

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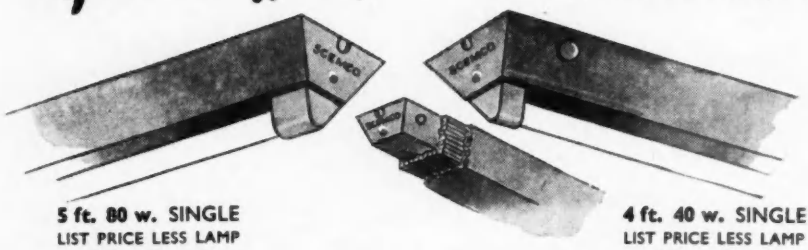

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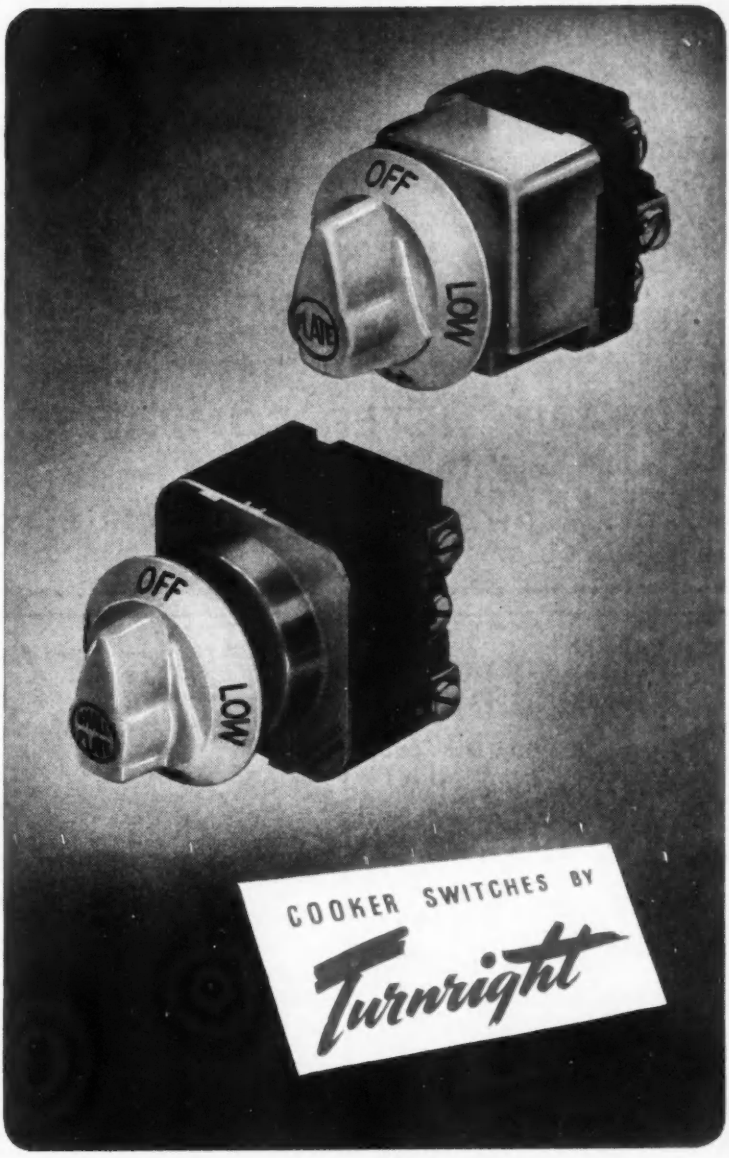

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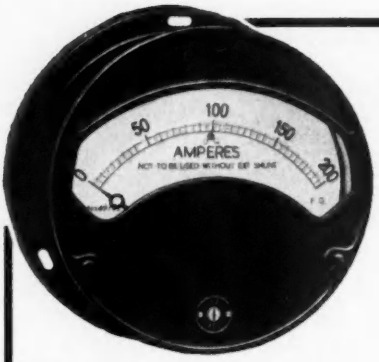

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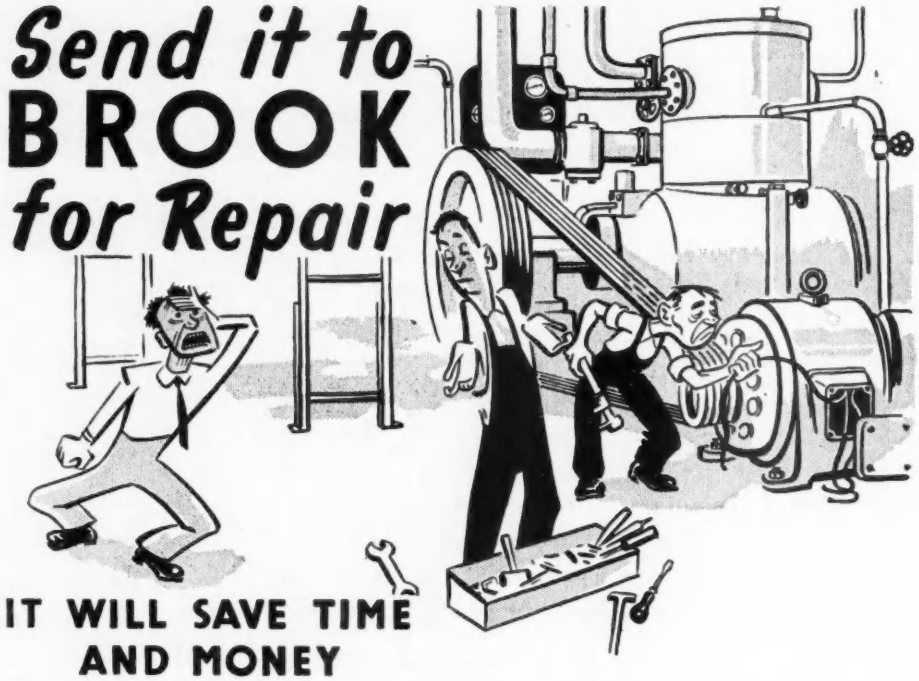

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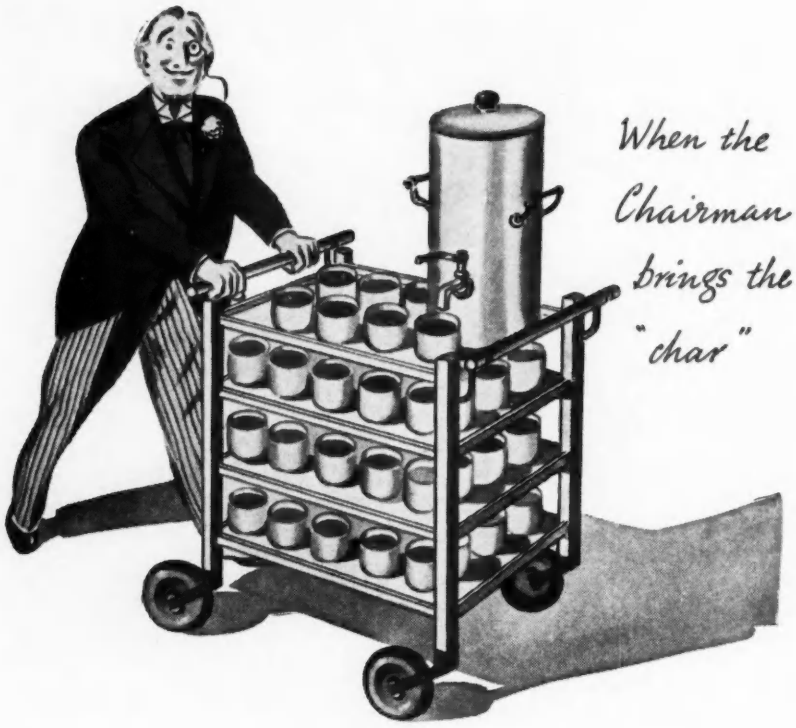

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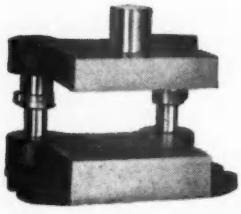

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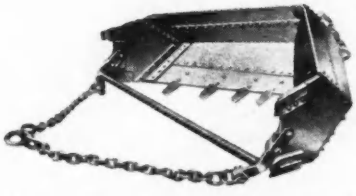

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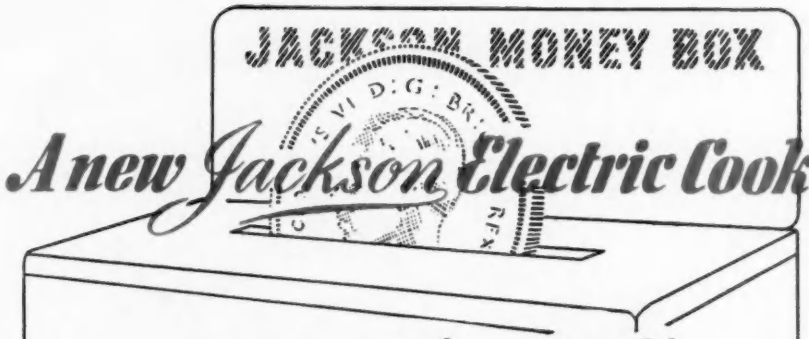

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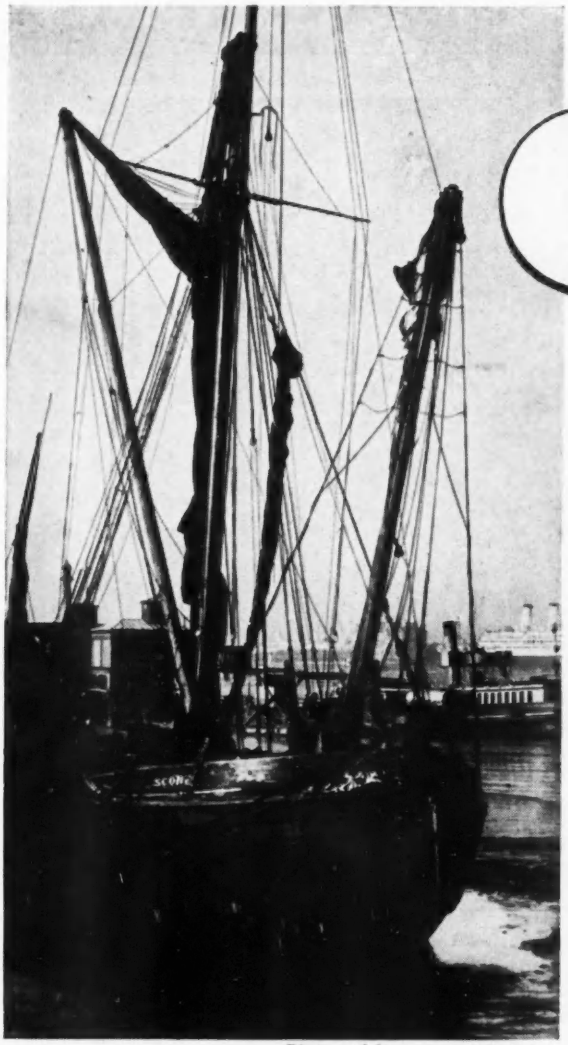

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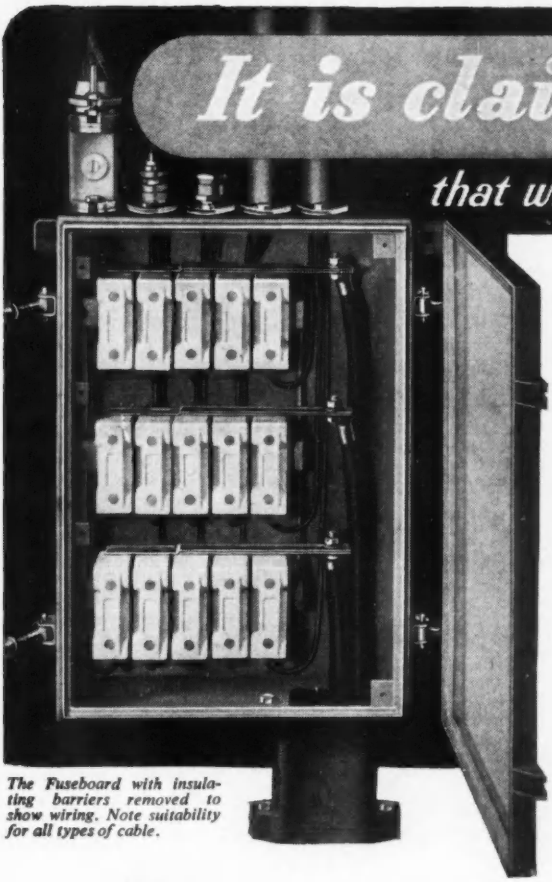

The Fuseboard with insulating barriers removed to show wiring. Note suitability for all types of cable.

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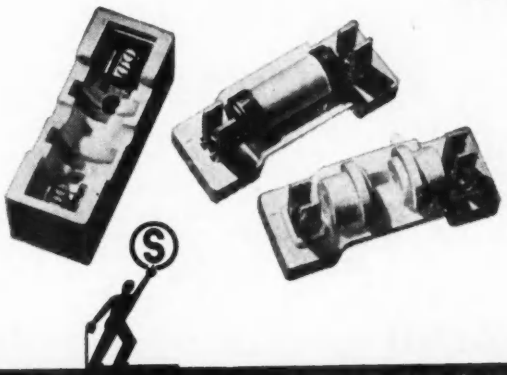

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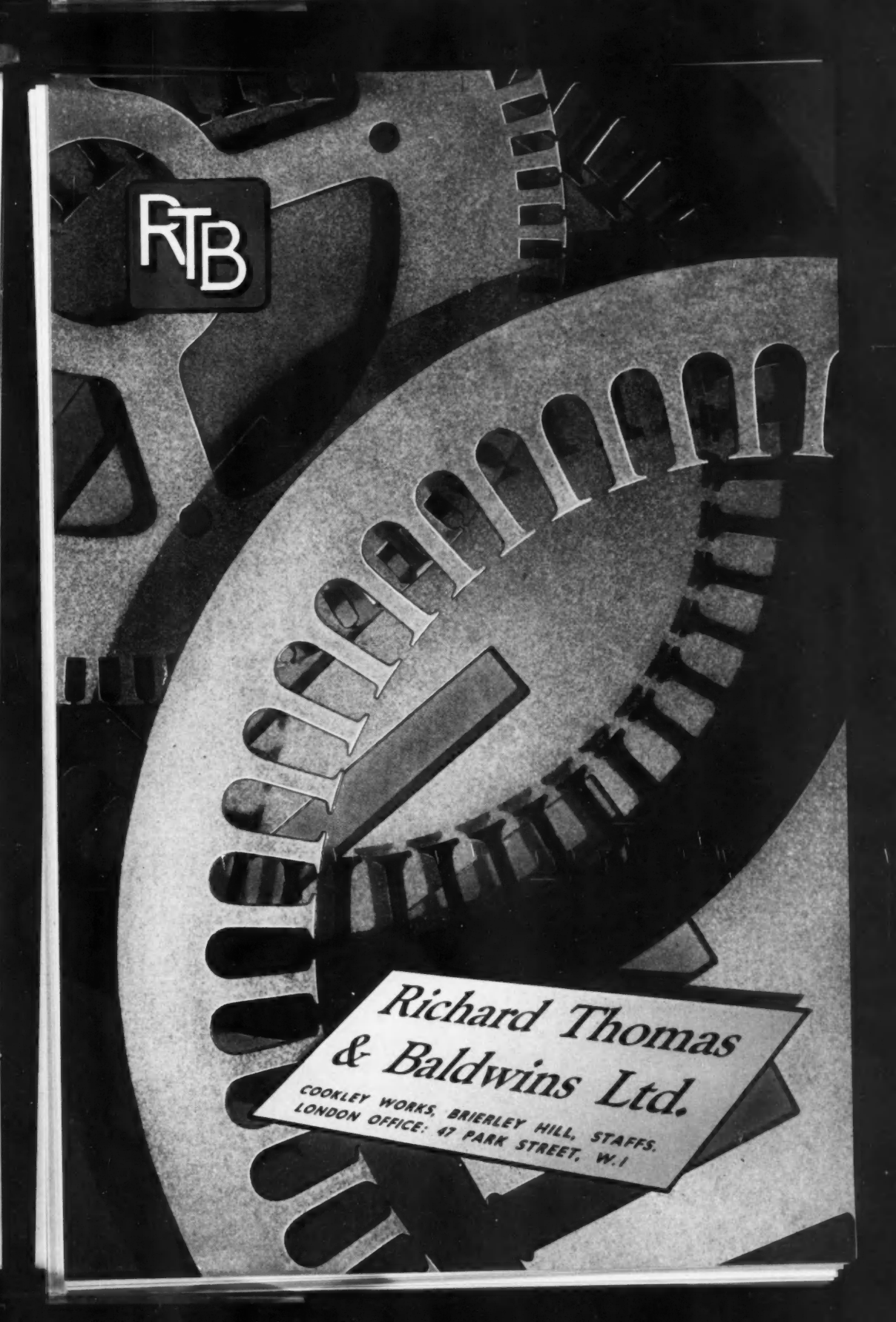
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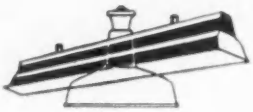

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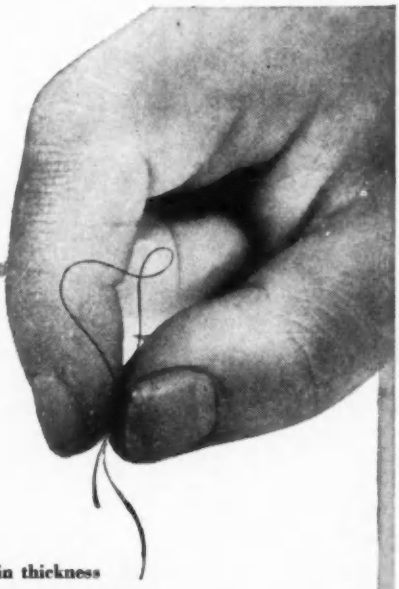

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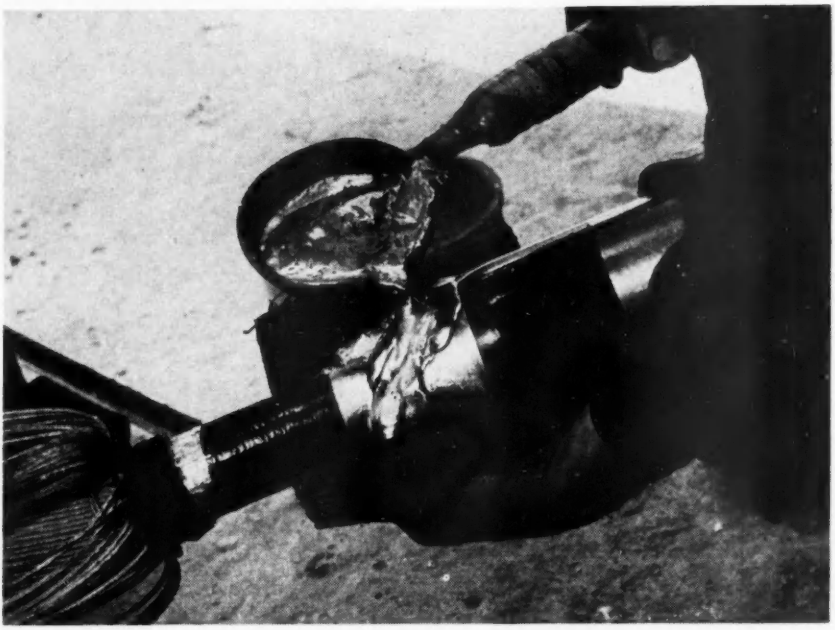

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Pouring Abbey solder prior to wiping on an 0.25 sq. in. II KV Cable

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ELECTRICAL TIMES

Vol. 121 No. 3156 THURSDAY, 1 MAY, 1952

PUBLISHED EVERY THURSDAY

SIXTY-FIRST YEAR OF PUBLICATION

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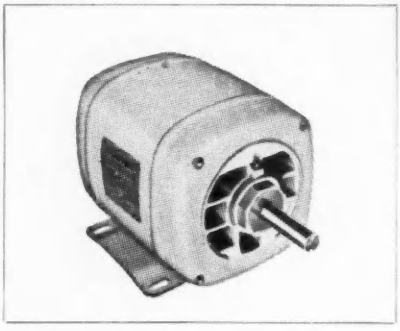
You've seen the Minister's picture dozens of times—but have you ever noticed *this* man, his private secretary? This is the man on whose unflurried efficiency the Minister so largely depends. In exactly the same way, by quiet, meticulous service, the Hoover F.H.P. Motor has earned the praise of manufacturers all over the world. They have learned to trust the Hoover 'fractional' for dependability, quality and efficiency.



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Editorial

TRADING UNDER DIFFICULTIES

PROBABLY no British Industries Fair has been held under such difficult trading conditions as the one opening next Monday. In previous post-war Fairs, the manufacturer has had to face a crippling purchase tax on many goods for the home market, periodic acute shortages of raw materials and the burden of a heavy rearmament programme. This year, in addition, he is confronted with restrictions of imports in many overseas markets and a growing competition from Germany and Japan. In such circumstances, the support given to the Fair says much for the confidence of the manufacturing industry in surmounting these difficulties. While certain sections of the Fair have shown some decrease in size, others, notably the plastics section, have shown considerable expansion. This may be attributed partially to the increasing use of plastics as substitutes for existing materials in short supply, and partially to a growing realisation of the usefulness of these substances as materials in their own right. As far as the electrical section at Castle Bromwich is concerned, little change is evident. One or two familiar names are absent this year, and the encroachment of non-electrical industries into Section C is somewhat more noticeable. On the whole, the Fair has attained the support it requires, and should be set for a further successful year.

COUNTER ATTACK

TOO LONG has the electrical industry been suffering from the pseudo fuel experts; too long has it failed to give the lie to those many erroneous statements on the subject of electric heating. Recently, however, there have been growing signs of serious concern at the headway made by our competitors, but the first real counter attack of the supply industry itself came last week from Sir John Hacking at the Institute of Fuel luncheon. This challenging address was particularly warming to electrical hearts. Both in its quality and in the broad nature of the audience to which it was directed, it seemed to herald a new phase in electrical propaganda; a time when the repressions of the last few years will be sublimated and all may once more feel free to speak openly of the merits of the domestic electric fire. This freedom is essential if the electric fire is to achieve once more the recognition it deserves, for in the silence of the industry, its competitors are now so well entrenched that only by aggressive propaganda can the position be restored to provide a balanced fuel policy such as this paper has been advocating in the past few months.

THE SEVERN BARRAGE

SIR JOHN also dealt at some length with the country's potential power resources, specifically referring to the Severn Barrage scheme. This brings to the fore once again one of the most debated and discussed projects in the field of electricity generation. In the past the scheme has been investigated in some detail, the last Report being published as recently as 1945. In both the 1933 and the 1945 reports, the overall economic efficiency was naturally taken as a function of the resultant saving in coal. As, however, prices of capital works and labour tend to rise in parallel with the price of coal, the scheme is always one step away from showing an economic return. If, however, after the barrage is built, the price of coal continues to rise, and in consequence a continued devaluation of currency takes place, the long life of the project would assure economic operation. This point was emphasised by Sir John, who stated that continued devaluation was highly probable. As a result, the B.E.A. is investigating the scheme in close detail, so that at an opportune moment work can be

put in hand without delay. This statement will put new heart into those whose faith in the essential soundness of the scheme has persisted.

BOLDNESS FOR D.C.

IN a recent report of the Electrical Research Association, advocating large-scale experiments with high voltage d.c. transmission, the development of convertor equipment, including valves, was given emphasis as the principal item with which a likely programme would be concerned. Some of the complications likely to accompany such a development were picked out in the discussion last week of the I.E.E. paper by Messrs. von Bertele and Tucker. The authors summarised the design considerations applicable to such a project, and went on to extend their ideas so far as to present a design for a single valve rated at 250 kV, 250 MW. It was hardly surprising that this proposal attracted much criticism, but its wealth of interesting ideas could not be denied. The use of large ceramic sections to build up the anode chamber was probably the most interesting point, in view of developments in other fields of engineering, while the attention given to heating the valve to control thermal gradients was a surprise for some whose main worry was cooling. Both these unconventional ideas, as well as several others, had as their object the avoidance of backfires due to sporadic disturbances: the authors dismiss boldly any hope of a solution of this problem based on a "compromise arrangement of small valves."

STATIONS IN AMERICA

TWO outstanding trends are apparent in the latest edition of the survey of U.S. steam station design conducted annually by our American contemporary *Electrical World.* They are, an increasing willingness to put plant out of doors, and a rapidly developing enthusiasm for closed-circuit television as a reliable means of watching boiler gauge glasses and monitoring p.f. and oil burners. There are 92 stations included in this list of current plans, and of these, no fewer than 38 have boilers wholly or partly out of doors, while in 10 stations turbines also are put in the open. Most of the latter are in the south of country, but they none the less have to withstand extremes of weather, and their increasing number seems to argue success for earlier experiments in this direction. Amongst more general features, there are two of particular interest in view of similar progress in Britain: the unit-boiler-turbine arrangement is being adopted almost universally, and the turbo-generators themselves comply with "preferred standards" as to ratings and steam conditions in about half the total number of cases. Reheat was adopted in 35 instances, mostly for ratings above 60 MW. Its rejection where size was not a problem was usually associated with low fuel costs.

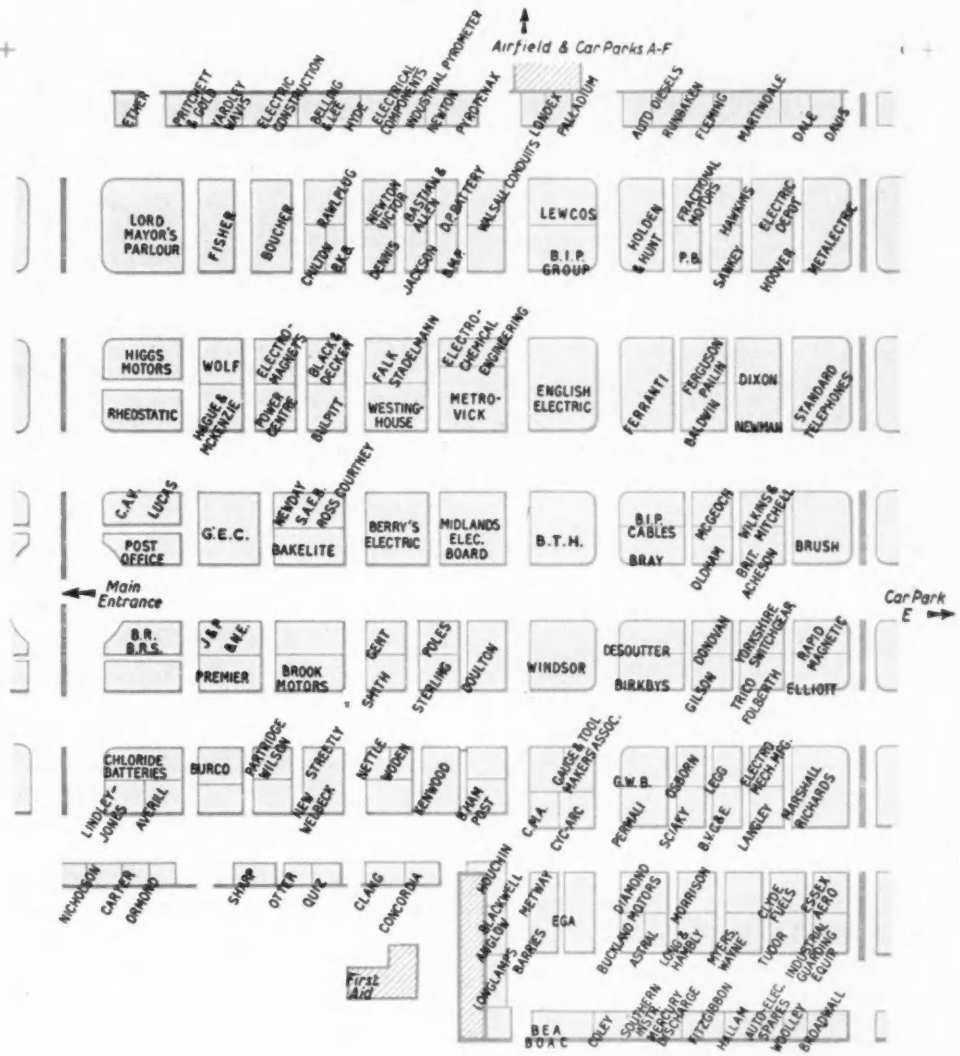
COAL IS EASIER

ABSENCE of severe weather and an apparent reduction in the rate at which the industrial load is growing, has meant for the supply industry a coal-stock position at the end of April which has not been equalled since 1948. With 4·2m tons in stockyards compared with 2·7m tons last year, the industry has a reserve officially estimated at 4·5 winter weeks' demand. The task of building up these stocks during the summer months to an end-October reserve of 6 or 7 weeks—say, 5·6m tons—should present little difficulty, if deep-mined production maintains its impetus and the weather remains dry enough to enable opencast working to proceed steadily. It is not unimportant in this respect that national stock figures are also high, the 13·2m tons available being nearly 3m tons above last year's level, so less competition for supplies may be expected during the build-up months. It seems probable that in these circumstances, a limit will be set to the total coal reserves accumulated. The level to be adopted depends on the rate of load expansion assumed, and here the difficulty is a variation between 6 and 13% in recent years—a difference that embraces some 2·5m tons of coal.

Meteor

The Electrical Section at the B.I.F.

CASTLE BROMWICH



THE above plan gives details of the electrical section—section C—at Castle Bromwich, Birmingham. It will be seen that in most cases the stand positions of the various firms are the same as they had last year. All stand numbers in this section are prefixed by the letter C and the avenues between stands are from top to bottom numbered 700, 600, 500, 400, 300, 200 and 100 respectively. The stand numbers run in ascending order from left to right.

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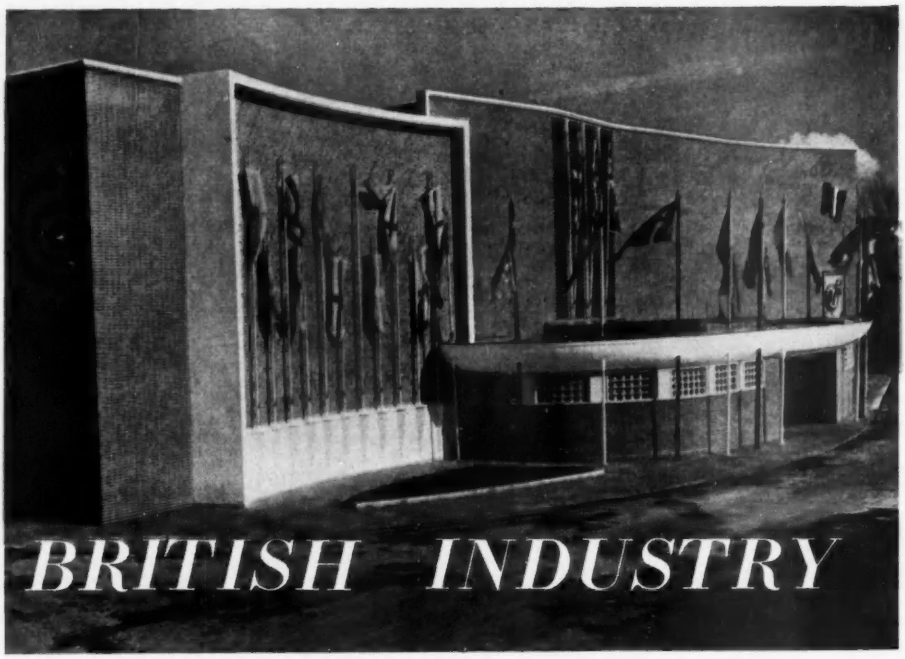


welcomes World Buyers

MAY 5-16

THIS year's British Industries Fair is being held under particularly difficult economic conditions. The increasing restriction on international trade, the growing competition of Germany and Japan, the shortage of raw materials and the burden of a heavy rearmament programme have all combined to place the British manufacturer in a most difficult position. Yet despite all this the total space taken by exhibitors is nearly the same as that taken last year. It is perhaps significant that the Castle Bromwich section at Birmingham has remained almost constant, the London section having fallen below that of 1951. This is partially due to the fact that the textile section in London made a special effort in the previous year as the Festival of Britain was expected to attract many potential overseas buyers.

Plastics have shown a remarkable expansion, the space devoted to these materials having increased by some 50% over the 1951 figure. One of the reasons for this is the trend to replace metal parts by plastic substitutes and several most enlightening examples of this can be seen at Olympia and Earls Court.

BIF

1952

Arrangements

The Fair will be open from 9.30 a.m. to 6 p.m. each day from Monday, May 5 to Friday, May 16, when the Castle Bromwich section will close at 4 p.m. All sections will close on Sunday, May 11. Overseas buyers will be admitted free of charge on presentation of their trade cards when a badge will be issued which will admit to all sections. Home buyers will be admitted by Trade Buyer's badge only, which may be obtained upon presentation of a

Photo of Castle Bromwich by permission of "Evening Dispatch" Birmingham

business card and payment of 5s. for a season ticket or, at Castle Bromwich, 2s. 6d. for a day ticket. At Olympia and Earls Court the public will be admitted on payment of 2s. 6d. on Saturday, May 10 and Wednesday, May 14. At Castle Bromwich, however, the public will be admitted every afternoon and for the whole of Saturday, May 10. The entrance fee is the same as London at 2s. 6d.

Transport facilities have been augmented this year by the introduction of a free bus service for buyers and exhibitors, and an air service from Croydon to Castle Bromwich. This latter has a provisional daily timetable of Croydon (09.45)-Castle Bromwich (10.45) and Castle Bromwich (17.00)-Croydon (18.00). The day return fare is £5 18s. 0d.

Special Attractions

The "Workers Day" at Castle Bromwich, is being held on Saturday, May 10, when employees of firms in over 100 towns will be arriving by train and charabanc. Parties are also booked to visit the Earls Court and Olympia section of the Fair on the same day.

London is holding its principal exhibition day for the public on Commonwealth Trade Day at Earls Court on Wednesday, May 14.

Aerialite Group

The Aerialite Group, consisting of Aerialite Ltd., Nettle Accessories, Aycliffe Industries and Ryecroft Electric Ltd., are sharing a communal stand. Cables are represented by "Ashton" T.R.S., V.I.R. and lead-covered types; "Ashathene" domestic and industrial power and lighting cables (in this category is a double armoured, thermoplastic-insulated cable manufactured for mining applications), and "Aerialite" automobile cables and h.t. cables. "Nettle" mains accessories and fittings may also be seen. Birmingham, C.309.

Airscrew Co. and Jicwood Ltd.

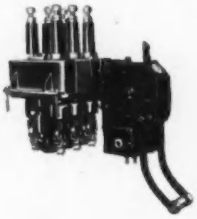
The display here consists of a range of axial flow and centrifugal fans together with insulated products. An unusual feature is a cooling tower assembly. The stand itself will be constructed of Weyroc "man-made" timber. Birmingham, D.726

Amplion, Ltd.

The new Amplion all-purpose testmeter is claimed to be the most competitive multi-range meter yet to be put on the export market. Convette units, which enable battery receivers to be run off the mains are produced in a range of nine units identical in size and shape with the dry batteries they eliminate. The new "Activette" battery reactivator will prove of interest to all those who have to use deaf-aids. Olympia, B.54.

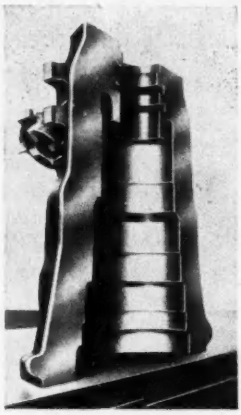
The Mazda blended light fitting gives good colour rendering

Johnson and Phillips have produced this "Trinal" o.c.b. for 150 MVA at 6·6 kV

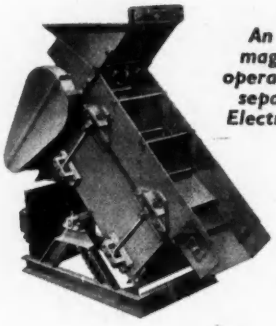


The "Efbee Climatiser" self-contained air conditioning unit

Exide - Ironclad cells of this type are used for traction duties. The side is cut away to show the significant features

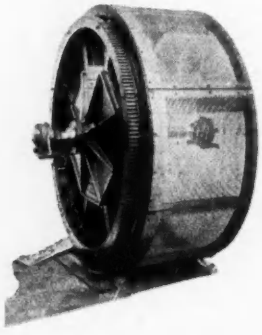


One half of a turbine case casting for a 60 MW set made by David Brown



An electromagnetically operated chute separator by Electromagnets

The Brackett cup-type screen for water filtration



Astral Equipment, Ltd.

Ideally suited to the flat dweller is the Astral $1\frac{1}{2}$ cu ft refrigerator which, with overall dimensions of only $24\frac{1}{4}$ in. by $22\frac{3}{4}$ in. by $21\frac{1}{4}$ in. will yet meet the needs of the small family. As this works on the absorption principle no interference with radio or television sets can be experienced, nor can there be any intermittent noise due to the stopping and starting of motors. Birmingham, C.108.

Auto-Diesels Ltd.

This firm is exhibiting a selection of generating equipments taken from their standard range including a Leyland-Auto Diesels model, as supplied for stand-by purposes, and a fully automatic domestic lighting set is the Enfield-Auto Diesels range incorporating the Mark II, HO2 engine.

Equipments not previously exhibited are a 1kW totally enclosed unit, as supplied for fitting to excavators to provide power for floodlighting, and a 500 watt, 230 V, a.c. portable equipment of extremely compact design. Birmingham, C.728 and 1229.

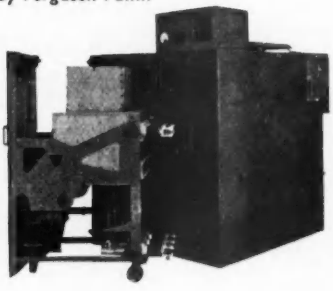
H. J. Baldwin and Co., Ltd.

Underground and overhead distribution equipment including disconnecting boxes, pole-boxes and overhead line material are to be seen. Representative of underground distribution are the cable protection covers, stoneware conduit and precast concrete accessories. Out of the distribution field the firm makes "Thermat" electric blankets, and "Wireohms" electric heating elements of all types and for all purposes. Birmingham, C.516.

Baldwin Instrument Co.

The use of nuclear emanations in industry is exemplified by the various equipments made by this firm. Several thickness gauges, using beta or gamma rays, ionisation meters and dosemeters are on view. For several industries the "Baldwin-Dunlop" statigun for measuring the static charges built up on materials while processing will be found a useful tool. Olympia, B.20.

A 3·3 kV, 1,200-amp air-break unit by Ferguson Pailin



Barries Electrical Agencies

Four main lines are being exhibited: "Barlecta" motor starters and push-button controls, and "Dexray" lighting fittings and switchgear. These lighting fittings include a completely new range of Catalin and Crystal Drop fittings which will be on show for the first time. Birmingham, C.102/225.

Lewis Berger Ltd.

Paints and finishes of all types are shown on the Lewis Berger Stand. These include the styrenated alkyds "Polykem" 111, 222, 666 and 999, "Leadium" metallic paint, transport finishes, "Hymeg" insulating varnishes, "Dimenso" dual colour finishes and various sports goods finishes. A full staff will be available to deal with all enquiries. Birmingham, B.621/518.

Berry's Electric Ltd.

Fires, lighting fittings, water heaters and switchgear for both home and overseas markets are well featured. The "Magicoal" and "Berrylog" fires give a realistic appearance of the old log fire. Lighting fittings embrace nearly every style and period, and can be employed in old and new houses in harmony with the existing surroundings. Water heaters are represented by the New Look 1½ gallon storage-heater in a range of four attractive shades, and of importance in these days of peak loads is an "off-peak" storage heater. Switch-fuses and plugs from the Viking range complete the display. Birmingham, C.507/406.

James Beresford & Son

The well-known range of Beresford centrifugal pumps is again being shown. Principal is the submersible pump which is lowered into the well or borehole. Multistage pumps cover outputs from 115 to 50,000 gallons/hr at heads from 10 to 1,000 feet. An interesting item is a car washing outfit for home or garage which provides two or more guns with water under pressure. Birmingham, C.405.

B. I. Callender's Cables

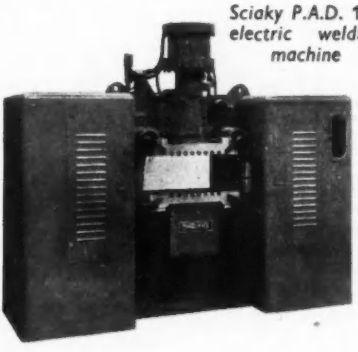
The theme this year is the Company's contribution to generation, transmission and utilisation of electricity. This will be illustrated by means of a series of displays. Among the exhibits is a built-up cleating system which fulfils the need for a readily alterable universal assembly where new arrangements or re-arrangements of cables may be frequently required. Consumers' service units are also featured; these will cater for a wide variety of arrangements. For distribution systems in mines are bolted flame-proof couplers, and for factory systems are detachable fused tee-boxes. Cables, cable repairing equipment, and vulcanisers are additional items. Birmingham, C.513.

Birlec Ltd.

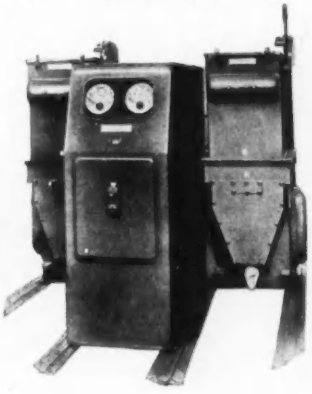
Attention is focused on the range of Lectrodryer equipment for the dehydration of air, particularly compressed air, other process gases and certain organic liquids. Three large units will be shown, two of the dual-adsorber type, one rated at 75 cu ft. of air/min at 50 lb per sq in., and one, the BWC 150, is designed to dry 560 lb of CO_2 per hour at a pressure of 220 lb/sq in. for "dry ice" production. The third model is for controlling humidity in storage processing and packing rooms. Several smaller units for laboratory or small production work complete the exhibit. Birmingham, D.509.

B.I.P. Group

At Birmingham the Streetly Manufacturing Co. is showing urea, melamine, phenolic and thermoplastic mouldings. B.I.P. Engineering Ltd., an associate firm, has its range of "Bipel" autocontrol presses. The Type 40 (20-40-60 tons), and the Type 100 (50-100-150 tons) will be working on the stand, while the Type 200 (100-200-300 tons) will be present but not operating. These presses can be operated on a ring-main pressure system, or, as in the Fair, can have self-contained drives. On the British Plastics Federation stand at Birmingham, the Group is showing sand cores bonded with Beetle Resin W20 and a selection of mouldings, while at Earls Court on the Federation Stand the Group is emphasising the use of Beetle melamine mouldings. Birmingham, D.322, C.618, C.319; Earls Court, V.12/15.



Sciaky P.A.D. 100 electric welding machine



Ring-main isolator unit (11 kV) by Yorkshire Switchgear

Ferranti's elegant meter testing desk is shown here

B.K.B. Electric Motors Ltd.

A wide range—the Birmingham range, made by Bulpitt—of electric motors, from ½ to 1½ h.p. single-phase, ½ to 7½ h.p. three-phase, and ½ to 7½ h.p. d.c., are being shown along with generators, alternators, m.g. and m.a. sets. The "Luton" range, by George Kent covers single and three-phase motors in small sizes up to ½ h.p.; universal motors up to ⅛ h.p. at speeds up to 10,000 r.p.m. and small special machines. Birmingham, C.608.

B.M.B. (Sales) Ltd.

This firm is displaying a comprehensive range of bearings with bore diameters from 1 mm to $\frac{3}{16}$ in. and with overall dimensions of 4 mm to ½ in. respectively, together with a few typical applications.

These bearings, which are available in rigid, angular contact, self-aligning and pivot construction, have been primarily developed for incorporation in precision instruments, gyroscopes, clocks, recording machines, and so on—in fact, all applications where friction has to be eliminated and where weight and dimensions are important factors. A shielded type of bearing which is growing incessantly in demand has also been developed. Birmingham, D.137.

F. W. Brackett & Co. Ltd.

An industrial size Central Flow Band type water screen will be working on the stand in addition to a cup-type automatic water screen and several water pumps. Birmingham, D.345.

Geo. Bray & Co. Ltd.

A large selection of both special and standard products made in the electric heating department, and different types of metal-clad ceramic-embedded elements are of interest. Immersion heaters for domestic and industrial use and examples of electric air heater batteries are also present. On the same stand, the insulating department are showing an interesting selection of insulators. Birmingham, C.412.

British Aluminium Co. Ltd.

The Company's stand will incorporate a mural illustrating a selection of the products, but is primarily designed as a meeting place for the Company's customers. No attempt, therefore, has been made to demonstrate products on a large sale. It will include, however, reproductions of designs illustrating the marine and structural engineering applications of aluminium by A. Games F.I.S.I.A. Birmingham, D.605.

British Ermeto Corpn.

Pipe line joints and couplings for use with a wide range of fluids are presented here, with demonstrations of joint making and pressure testing. Birmingham, D.723.

British Geon Ltd.

British Geon will be represented on three stands at this year's B.I.F. At Olympia in conjunction with other members of the Distillers Co. Group, at Earls Court and Castle Bromwich on the British Plastics Federation stands. The theme at Earls Court illustrates P.V.C. raw materials and finished products. Earls Court, V.12 and 15; Birmingham, C.618.

British Moulded Plastics Ltd.

Products of this organisation are being shown at both Birmingham and Earls Court. At the former the associate company, Moulded Products Ltd. will have a large selection of mouldings made for outside firms, including a water heater casing for Berry's Electric, a moulding for the Ega Spraygun, and injection mouldings in polystyrene for English Electric refrigerators. Radio and television cabinets are also included in the Earls Court display on the British Plastics Federation Stand. Birmingham, C.614; Earls Court, V.

British Resin Products Ltd.

This company is the manufacturer of various plastic moulding powders and materials including "Cellmold" (cellulose acetate); "Distrene" (polystyrene); "Rockite" (phenolic and urea) and the "Epok" synthetic resins for laminating, impregnating and surface-coating requirements. In the adhesive field they make "Cellbond" synthetic resin adhesives. Birmingham, C.618.

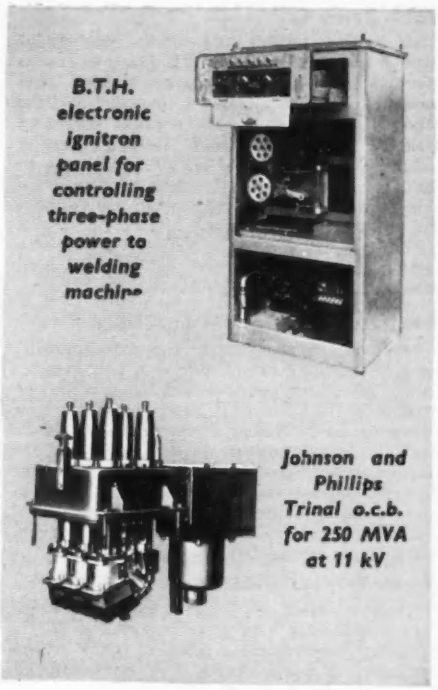
British Ropes Ltd.

Modern methods and processes in ropemaking are well demonstrated on this stand. It is perhaps

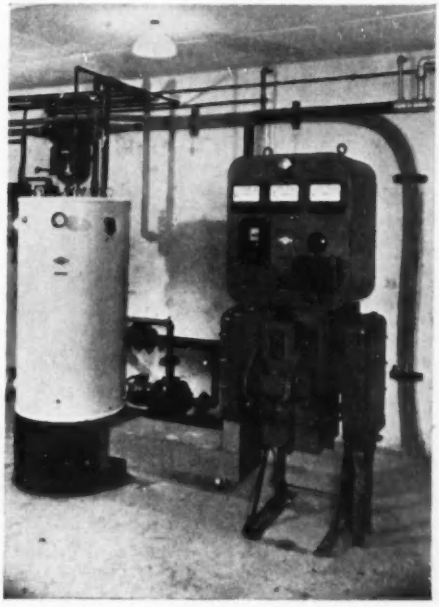
not generally known that there are in use today over 4,000 different combinations of sizes and types of ropes. A revolving display illustrates a simplification scheme being put forward by the wire rope makers to reduce this number. The work of the technical service department is explained by showing the types of instrument used in testing ropes *in situ*. Finally the uses and advantages of nylon ropes are emphasised. Birmingham, D.351/246.

British Thomson-Houston Co.

The stand here is in itself of great interest, being a correctly scaled reproduction, over 16 ft high and 14 ft diameter of a 62,400 kVA vertical water-wheel alternator, as made for the Los Peares station in Spain. This forms an appropriate background for the wide range of exhibits representing the whole field of electricity generation and utilisation. In the traction field are a scale model of a 1,000 h.p. diesel-electric shunting locomotive and a full-scale replica of the driver's cab. Industrial drives are represented by numerous induction motors. Control gear of all sizes from a large high voltage reversing contactor for a 2,370 h.p. 6·6 kV slip ring mine winder motor down to the smaller sizes of 30 h.p. are shown. Several exhibits show the application of electronics to industrial processes, and industrial materials heating is also included. A research section gives some idea of the new developments now in hand. Mazda lamps and lighting fittings for all applications are included. Birmingham, C.511/410.


B.T.H. electronic ignitron panel for controlling three-phase power to welding machine
Johnson and Phillips Trinal o.c.b. for 250 MVA at 11 kV

(Right) An "Autolec" 450 kW water heater (G.W.B. Electric Furnaces)



British Trane Co.

Air cooling, heating and conditioning equipment is featured by the British Trane Co., who have several entirely self-contained units. The floor models are the Efbee "Climatizer" and the Efbee "Climatroller," with nominal duties of 8,000 and 14,400 BTU/hr respectively. For smaller volumes is the Efbee "Climette" which may be fitted to a window-sill. These conditioners are only available for industrial use in this country, and are normally for export only.

For heating only are the "Vectair" heaters with listed loadings over a range from 500 W to 3 kW. Birmingham, B.330.

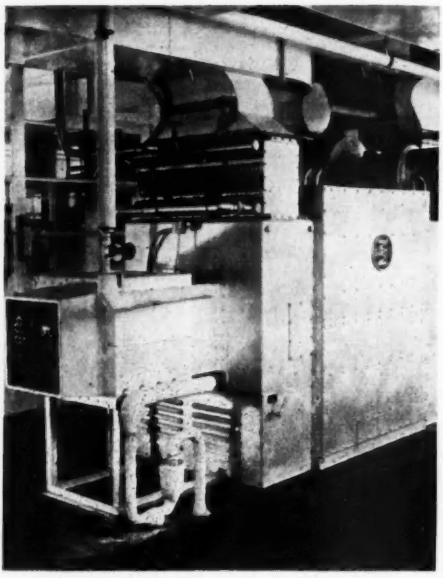
Brit. Vacuum Cleaner and Eng. Co.

Industrial vacuum cleaners are prominently featured. These have a variety of uses ranging from the removal of metal filings and waste material to the handling of liquids and pneumatic conveyancing of industrial powders. The model T.87 is used extensively in gas works for the removal of hot flue dust. Included is a model for domestic chimney sweeping which is claimed to remove much of the dirt and labour associated with this necessary and inconvenient function. Birmingham, D.203/102.

British Tyre and Rubber Co.

The elimination of vibration caused by reciprocating machinery is of great importance, and to meet this requirement a range of B.T.R. vibro-insulators is being shown. A demonstration with a powerful compressor operating on the normal exhibition floor, but fitted with these mountings, effectively demonstrates their efficiency. Of more direct electrical interest are electrician's rubber gloves and gauntlets, including hand-made seamed and seamless types, heavily reinforced models for rough service. Special quality individually tested gloves for high-voltage duties, certified to conform to B.S. 697 are also on show. Other products are belts and belting for power transmission drives for all horse-powers. Birmingham, D.615.

Birlec "Lectrodryer" in a pharmaceutical packing room



Brook Motors Ltd.

A new innovation is the "TC" type totally enclosed fan-cooled motor. The heat in these machines is dissipated by the internal air circuit through the casing. They are eminently suited for use in dirty or dusty working conditions and come in a range from 2 to 100 h.p. Further improvements have been made in the Brema range, which is interchangeable with U.S. motor types. Hand operated and automatic control gear includes a new contactor—the "ATF" flush mounting starter, which should prove popular among those machine tool makers who build a motor starter into a prepared cavity on the machines. Birmingham, C.304.

Brush Elec. Engineering Co.

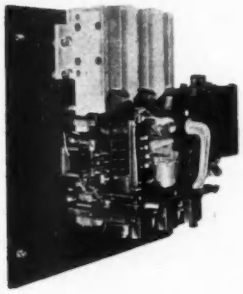
Prominent is a 2,500 kW Brush Ljungstrom turbo-generator set representative of the range which varies from 1,500 to 60,000 kW. For distribution is a standard 500 kVA transformer with a new construction. Switchgear is represented by a metal clad compound-filled type VC 250 MVA draw-out pattern. This is intended mainly for use on systems up to 11 kV. Among the electrical rotating machinery are several alternators and motors to illustrate the wide range of these machines manufactured. Models are used to represent the Brush-Bagnall shunting and main-line diesel electric locomotives. These are powered by Mirrlees "J" type engines and can be supplied in a range of sizes from 400 to 2,000 h.p. Birmingham, C.519/418.

Bulpitt and Sons

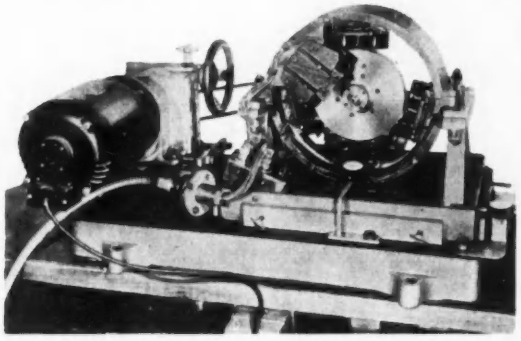
The well-known "Swan" brand range of electrical domestic appliances, ground base aluminium holloware for heat storage and electric cookers are prominently featured. Specially exhibited this year are the range of electric heating pads and blankets. These are for use on a.c. mains only. A complete selection of immersion heaters for electric appliances and a new range of 3 kW domestic immersion water heaters are also included in this display. Birmingham, C.506.

Burco Ltd.

The full range of Burco electric wash boilers is on view. This includes the Standard Housing Type, De-Luxe, Round and Cabinet models. Domestic appliances are represented by the Burco electric porringer, and the Burco all-electric washing machine. Birmingham, C.303.



Left is one of the English Electric air circuit-breakers



Electric Construction Co. make this new type push-button starter

A turbine instrumentation test rig at the G.E.C. laboratories

Cable Manufacturers Association

The stand this year will not carry any specific exhibits but will consist of an office where representatives of the firms in the Association may meet and discuss matters with buyers and other interested people. Some members have their own separate stands on which they are displaying their own products. Birmingham, C.319.

Campbell Engineering Ltd.

Of electrical interest are the "Hotway" rapid water heaters and the immersion heaters which can be supplied with or without thermostatic control. The rapid heater has a loading of 3 kW and can produce one gallon of hot water in 2½ to 3 minutes or one pint of boiling water every 65 to 75 seconds. Birmingham, A.328.

Carter and Co. (Nelson) Ltd.

Principal items on this stand are the warning sirens ranging from small one-eighth h.p. units up to the 5 h.p. units as supplied to the Government for air-raid warning purposes. In addition there is a full range of Carter unit heaters, which, while similar to those shown last year, embody detailed improvements and modifications found desirable in the light of past experience. Birmingham, C.203.

C.A.V. Ltd.

The electrical items are generators and engine starters for marine and industrial plant. Switchboards, control panels, lead-acid and alkaline batteries, and road transport electrical accessories are also shown. In view of the pronouncements on inefficient rear lighting of transport vehicles, a new lamp, the VP60 stop-tail lamp, has been produced. It has a large ruby glass (3⅜ in. diameter) for good visibility. The lampholder base carries three bulbs, two rear lamp bulbs in parallel for normal tail duty and one of larger wattage for the stop lamp. The lampholder is carried in a strong glass body covered in a thick rubber moulded surround, the rubber housing being arranged to form the seals. Birmingham, C.501.

Chilton Electric Products Ltd.

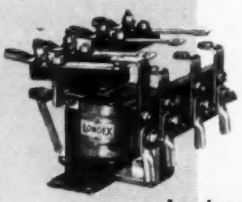
Three-quarters of the stand is devoted to the display of miniature h.r.c. circuit breakers and earth-leakage trips. These are demonstrated under full short circuit conditions, and are also incorporated in a house distribution unit which provides a five-way distribution *via* h.r.c. fuses with earth leakage protection. The remainder of the stand is occupied by the BUK dry shaver and its accessories. Birmingham, C.606.

Chloride Batteries Ltd.

The advantages of electric vehicles and trucks are impressively outlined by illuminated panels. This leads to the selection of typical Exide-Ironclad batteries below. Another exhibit is the "Keep-alite" emergency lighting system. Drydex batteries suitable for all uses are shown, and, as a finishing touch there will be a typical Exide aircraft battery. Birmingham, C.301.

Clang Ltd.

Prototypes of the following items are being shown: A 5 amp surface type ceiling switch available in 1- and 2-way and finished in the usual colours; a semi-recessed switch with positive quick make and break action and a 5 amp flush switch. A new design is a 5 amp, 3-pin, top-entry, non-shuttered switched socket. In addition a complete range of electrical accessories suitable for com-



Londex relay contactor Type LB

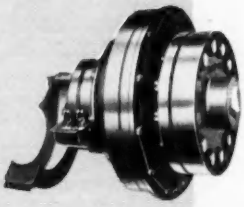
mercial and domestic installation is available, as well as aircraft electrical accessories to A.I.D. and A.R.B. approval. Birmingham, C.215.

E.K. Cole—Plastics Div.

Mouldings that provide for plastic products ranging from meter panels to toilet seats are shown on the stands of this company. Displays include refrigerating components, relay switches, and radio and television details. Birmingham, C.618; Earls Court, V.12/V.15.

Copper Development Association

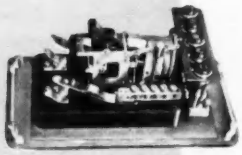
Display panels show examples of efficient applications of copper and copper alloys in the chemical, electrical, mechanical and building industries. Another panel, as a warning, shows a few failures which could have been avoided by timely consultation with the Association. The invaluable technical information services and publications of the C.D.A. are free to all who can make use of them, and the specialist staff of the Association are in attendance daily to deal with inquiries from home and overseas visitors to the Fair. Birmingham, D.232.



Rapid Magnetic Machines electro-magnetic clutch

Copperad Ltd.

Representative models from the range of heating, ventilating and combustion equipment made by the Company include unit heaters having ratings of 2·625, 5·25 and 10·5 kW, and fan convectors operating on steam or hot water. An automatic burner for handling solid fuels including coke and coal is of interest. Birmingham, B.721.



Chilton Electrical Products house distribution unit

P. B. Cow, Ltd.

Rubber mouldings and extrusions for the general engineering, motor, radio, aircraft and refrigeration industries are produced by this firm, as well as adhesives, and plastic products. Birmingham, D.619.

Cyc-Arc Ltd.

The latest stud-welding equipment, comprising the Type E3 controller unit, with the type D hand tool, and the fixed head Type F bench tool is shown. Several improvements in the Type F electro-hydraulic tool have been made in the light of past experience. D.c. welding current for demonstrating both the above equipments is obtained from a Cyc-Arc Standard Transformer-Rectifier Unit,

The Elliott dynamometer reflecting wattmeter

Ferranti's seven-range clip-on volt-ammeter

which is capable of delivering adequate power for welding studs ¾ in. diameter and above in normal conditions. If required, the unit can be employed for arc-welding duty, when not in use for stud-welding. Birmingham, C.218.

Davis and Timmins Ltd.

Here can be seen the vital accessories of the electrical industry—screws, nuts, washers, studding, terminals, cable sockets, connectors and conduit bushes. The firm also manufactures all types of brass automatic machine repetition parts as used in the electrical and allied trades, as well as inserts for plastics, etc. Birmingham, C.316.

Desoutter Bros., Ltd.

While the principal emphasis is concentrated on the pneumatically operated small hand-held power tools, the two-speed electric drills introduced last year are again on view. It may be remembered that these have capacities of ⅜ in. and ½ in. and are fitted with 0·35 h.p. motors incorporating full radio suppression. Their weight is only 9¼ lb. Other electrical tools include the drill guns, screw guns and nut runners. Birmingham, C.415.

R. G. Dixon & Co.

R. G. Dixon and Columbus Ltd. have now combined to form the Columbus-Dixon Organisation. Emphasis this year is being placed on the "Scrubmaster"—a medium duty machine combining both floor scrubbing and drying in a single unit. This was shown in its original form last year, but has now been so modified and re-designed that the present model is virtually a new machine. Birmingham, C.619.

Donovan Electrical Ltd.

This exhibit includes a range of a.c. direct-switching starters up to 50 h.p. and a new small direct-switching starter for use with motors up to 3 h.p., 550 volts. Examples of automatic star-delta starters, slip-ring motor starters, reversing starters and special purpose control panels are included. In addition, there is a display of "Donlok", "Safuse" and "Scrutact" heavy-duty ironclad switch and fuse gear, also a short length of patent "Runtact" overhead busbar ducting of the latest protected type with moving contact-trolley, for feeding electric tools, hoist blocks, etc., from the busbar ducting. Birmingham, C.417.

Doulton & Co. Ltd.

Among the numerous Doulton products are several groups of electrical-porcelain insulators, including cable sealing ends, conductor rail supporters, cap and pin pillar post units for outdoor switching stations, radio mast insulators, and overhead line insulators. An interesting group are the surge diverter insulators up to and including 33 kV working voltage. Birmingham C.411/310.

D. P. Battery Co.

The well-known "Kathanode" traction cells will form the principal exhibit. Examples showing the utilisation of the "Kathanode" method of construction for marine use will be displayed. Other cells will represent the D.P. stationary battery range as used for emergency lighting, signalling, communications, and so forth. Birmingham, C.713.

Ebonestos Industries, Ltd.

Plastic mouldings in synthetic and natural resins, and bitumen for the electrical, scientific instrument, telephone, engineering, motor car, aircraft, building and other essential industries are among the products. Birmingham, C.618.

E.D.A.

In connection with the Midlands Electricity Board, E.D.A. are developing the theme of the help electricity gives to the pottery industry. In addition to a range of models that shows the stages in the production of ceramic ware, there are live demonstrations of electrical aids to pottery work. Birmingham, C.408/409.

Ega Electric, Ltd.

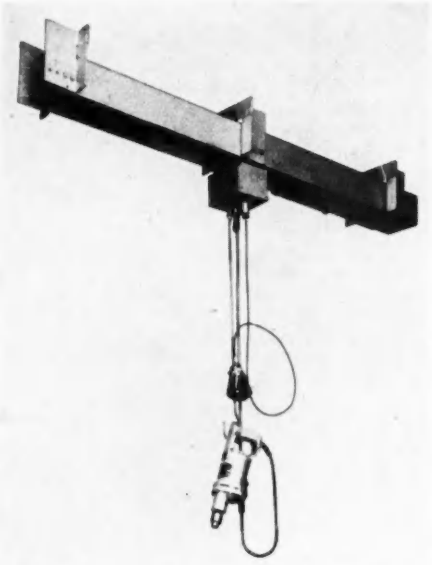
The "Egaspray" all-electric spray gun is now in full production. A special feature of this gun is the introduction of nylon gears between the motor and the centrifuges which hurl out the spray. Apart from this interesting item, the firm is showing malleable conduit fittings, "Egatube" non-metallic conduit and fittings, plug-in motor control gear, and specially built remote control panels embodying plug-in starters. Birmingham, C.227/104.

Electrical Construction Co. Ltd.

Push button contactor type d.o.l. starters designed for a.c. motors of up to 7½ h.p. rating are a new product featured on this stand. This range has three time-lagged overload releases, and the

The redesigned Cyc-Arc Type D hand-tool for stud welding

One of Wolf's electric drills—the "Cub"



Donovan "Runtact" ducting for providing power to portable tools

streamlined case is suds and dust tight. The outstanding exhibit, though, is probably a 1,500 r.p.m. self-synchronising and automatically regulated motor alternator set, complete with 3·4 kW alternator and the necessary control gear. Also shown are a plating rectifier, ranges of induction motors and of indicating instruments, and a 12-phase mercury arc rectifier. Birmingham, C.708.

Electrical Components Ltd.

This stand concentrates attention entirely on the "Wembley" electric oscillating fan, which works from a.c. single phase mains with a power input of 48 watts. The air output is 1,200 cu ft/min. Birmingham, C.714.

Electro-Chemical Engineering Co.

Shown in full production, a fully automatic Efco-Udylite "Junior" plating machine is the feature of this stand. In connection with its operation the new Efco-Udylite automatic rack loader and unloader is demonstrated. The process selected for demonstration is the bright zinc plating of steel parts, but samples of bright copper and white brass plating are included in this particular demonstration. Birmingham, C.611.

Electromagnets Ltd.

Exhibits of particular interest here are a fully enclosed version of the Boxmag electromagnetic conveyor head, a high-intensity heavy duty agitated chute separator, for removing fine iron, etc., from powders, and prototypes of a new range of improved permanent magnet separators. Birmingham, C.605.

Electro-Mechanical Mfg. Co.

The exhibit here comprises a display of high quality low-tension switch and switchfuse gear of the totally enclosed metalclad design as supplied to the principal oil-producing companies. Capacity ranges from 30 to 500 amps, and the units include oil-immersed metalclad circuit-breakers, metering equipment and contactor type motor starters. Birmingham, C.419.

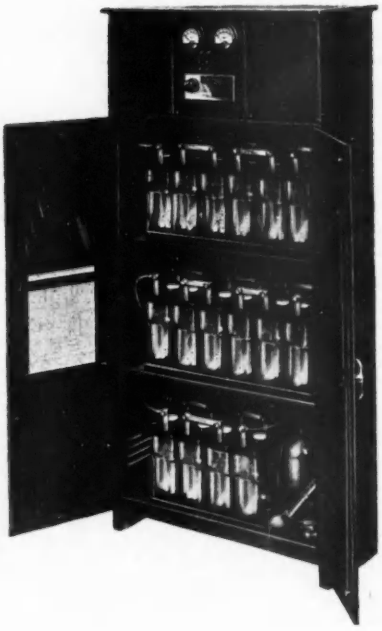
Elliott Bros.

Automatic control apparatus is represented on this stand by a furnace temperature system in which special attention has been given to safety devices. As well as a wide range of indicating and recording instruments there are a kVA instantaneous demand equipment and magnetic amplifier operated units for various purposes, including the control of lighting. Products of the associated Fisher Governor Co. include liquid level control units and diaphragm motor valves. Birmingham, C.320.

English Electric Co.

Featured here is a 300 b.h.p. E.E. Diesel which is driving an alternator and its exciter. The output from this generator is controlled by a 15 MVA, 400 V, 600 amp air c.b., with a combination fuse switchboard and two 300 amp t.p.n. fuses. Fusegear is also represented by a 1,200 amp cartridge

Tudor Batteries have this self-contained switch tripping unit for power station operation and similar use



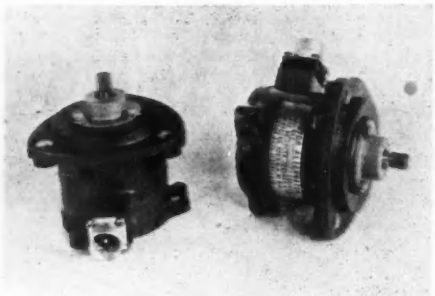
fuse certified for 35 MVA breaking capacity. Unitised control and relay panels of a recently introduced design are on view, while rectifiers are represented by a 50 kW mining unit and a 300 kW 15 kV d.c. radio type design. From the heating range a 25 kW h.f. induction unit has been shown for exhibition. It uses an air-blast cooled oscillator valve. Finally, there is a range of industrial motors and some examples from the company's domestic products. Birmingham, C.613/512.

Esso Petroleum Co. Ltd.

The stand is laid out for the reception of trade visitors wishing to discuss the uses of petroleum products. An interesting exhibit built into the stand is a mechanical "flow chart" of the refining process. By press-button operation a particular end product flow can be followed from beginning to end. Birmingham, D.433/332.

Falk Stadelman

A wide range of new as well as established designs have been selected for exhibition on this stand. Amongst the new items is a surface switch



These special inductor alternators are made by Newton Bros.

designed to look flush, suitable for a.c. use; a new lighting fitting specially designed for shop window lighting where low ceilings are met with, and a new heat controlled iron that uses special techniques to give satisfactory performance with a 3 lb iron. The remainder of the company's wide range of products is also well represented. Birmingham, C.609.

Ferguson Pailin Ltd.

Centrepiece of the stand is a large illuminated power system diagram with superimposed scale models and photographs of all types of gear used from 132 kV to 440 V. The switchgear shown includes the new ASB 33 air-break unit rated at 150 MVA at 3·3 kV, 1,200 amp. current rating. Other models are available up to 2,400 amp. This has been designed for control of power station auxiliaries. On the industrial side is a 440 V, 1,200 amp., 25 MVA oil circuit breaker. Birmingham, C.617.

Ferranti Ltd.

Most of the exhibits on this stand come from the company's meter and instrument sections, but transformer production is well represented by three units built to a new B.E.A. specification, and by a 50 kVA moving coil regulator of feeder pillar construction. Amongst the meter items is a recently introduced polyphase meter testing set, which has a voltage output of 500 VA/phase, up to 600 V, and a current range up to 100 amp. There is also a high speed electronic test set which uses stroboscopic effects in connection with photo-electric cells to check the speed of house service meters against a standard. Amongst new items is a kVA.hr three-phase meter which uses a transductor in its current circuit. There is also an a.c. prepayment meter with a new coin mechanism, and backing up these displays are a number of exhibits from the company's instruments, electronics and insulation dept. Birmingham, C.615/514.

Fescol, Ltd.

The avoidance of wear can be a great contribution to maintenance and efficient running of plant. For this reason the Fescol system of electrodeposition of nickel and chromium both for corrosion prevention and for the building up of worn components is of great interest. Birmingham, D.652.

Fibreglass Ltd.

Moulded pipe insulation is emphasised in this display, Fibreglass insulating wool being used in its construction. A demonstration shows how coal can be saved by careful thermal insulation of steam piping. Examples are available of Fibreglass products for electrical applications. Birmingham, D.312.

General Electric Co.

For this year's exhibition the company's research effort has been selected for spotlighting. In its background the stand represents the whole of the research laboratory's activities, but four instruments used in this work have been selected for demonstration. These are: a spherical integrating photometer, a turbine vibration test set, a vacuum pump system, and a valve vibration life-testing machine. End products of research are illustrated

The Martindale bench-type undercutter for commutators

by four further exhibits chosen to represent some of the output of the research laboratories production section. The items concerned here are cold pressure welding, turbine supervisory equipment, microwave circuits, and diamond wire drawing dies. Further static exhibits round off this display. Birmingham, C.503/402.

Gent and Co. Ltd.

Items shown are representative of the many products, particularly in the horological field, for which this firm is famous. Apart from this field, however, Gents' also make "Tangent" electric bells, fire alarm systems, water level recording apparatus, mine signalling equipment, luminous calling systems and burglar alarm systems. Birmingham, C.407.

G.W.B. Electric Furnaces

A complete thermal storage plant including a 200 kW "Autolec" water heater is exhibited here to show how automatic heating of buildings may be organised with a night load for the electricity supply. In addition, steam raisers rated between 30 and 150 kW are shown, and a 100 kW hand-operated water heater. Birmingham, C.321.

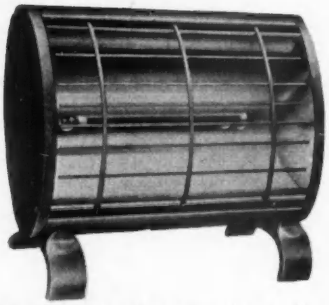
Gulf Oil (Gt. Britain) Ltd.

Specimens of special oils developed for electrical use are being shown. These include the "Silvertown" series of transformer, switch, condenser and insulating oils; electrical contact lubricants; dashpot oils of various viscosities, special meter oils and turbine oils. Birmingham, D.534.

The "Scrubmaster" by R. G. Dixon and Columbus dries as well as scrubs

Hale and Hale (Tipton) Ltd.

Recently developed types of castings for use in o.h. power systems are amongst the products shown by this firm which specialises in blackheart malleable iron. Castings for boilers, stokers, valve gear and heavy flameproof switchgear are also on view. Birmingham, D.508/609.



Premier electric heaters have this well-guarded fire for domestic use, on view

Hague and McKenzie Ltd.

Established production lines are presented by this firm, which is not introducing any new line this year. To the fore on the stand are aluminium utensils specially designed for use on electric hotplate cookers, in designs suitable for domestic cooking and for heavy duty catering. Birmingham, C.502.

G. A. Harvey and Co.

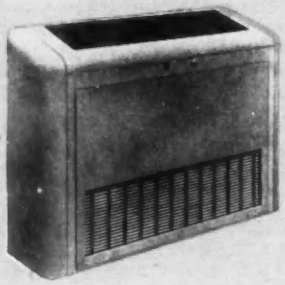
Central feature on this company's Birmingham stand is a spun metal heater, 12 ft 6 in. dia and 3 ft 6 in. deep for a pressure vessel, while displayed with it are examples of metalwork on a lighter scale, with the accent on perforated metals and woven wire cloth. At Olympia, filing and storekeeping equipment is shown. Birmingham, B.329; Olympia, F.29.

L. G. Hawkins and Co.

The well-known range of Hawkins products is being shown here. These are specially designed for the home and include the Hawkins universal pressure cooker, the new Tab-I-Top Mincer, the Electric Hostess, and a number of other appliances Birmingham, C.723.

Higgs Motors

No new products are being shown by this firm, which is concentrating on examples from its standard range. Both small and large motors are exhibited, including units for machine tool drives and a.c. commutator motors. Birmingham, C.601.



On the left is the Fan convector by Copperad, and right is the "Vectair" convector by British Trane Co.

Hoover Ltd.

The principal attraction at Birmingham is the range of fractional horse-power motors. Two particular types are emphasised: the drip proof, with a new improved all-duty performance in sizes from ⅛ to ¾ h.p., and the totally enclosed type ranging from ⅛ to ½ h.p. At Earls Court are the domestic appliances, including the Junior Model vacuum cleaner, first shown last year, and the heavy duty model for hotels, restaurants and public buildings. The Hoover electric washing machine continues to retain its popularity both in home and export fields. Birmingham, C.626; Earls Court, Stand X.

Houchin, Ltd.

In addition to a comprehensive range of alternators, 100 to 800 kVA, the Houchin organisation can also supply complete diesel generating plants. These are 100 kVA with the Ruston and Hornsby 6 V.P.H. engine and 100 and 200 kVA with G.M.C. engines. Birmingham, C.219.

James Howden and Co.

The exhibits here represent the large-size plant made by James Howden. Various scale models are widely used to illustrate the types of fan impellers—forced and induced draught fans, exhauster fans, sintering fans, axial flow fans and aerofoil bladed fans can be seen. The Howden - Ljungstrom rotary regenerative air preheater, and the Howden multi-vortex and Centicell dust extractors are also represented. Photographs of installations in power stations and in industrial premises illustrate the scope and application of Howden products. Birmingham, D.505.

I.C.I.—Metals Division

Non-ferrous metals in building and transport are featured here, as well as a general display of sheet, strip, rod, etc., in copper, aluminium and their alloys. Other non-ferrous materials being shown include cupro-nickel and phosphor bronze. These are also in the form of semi-finished products. Birmingham, D.308/409.

I.C.I.—Plastics Division

At Birmingham, the theme of this company's stand is the variety of properties that plastic materials possess, and their wide range of uses for the engineering industry. In London an information service is provided. Birmingham, D.412; Earls Court, V.3.

International Combustion Ltd.

This year, International Combustion are exhibiting a Type "L" travelling-grate stoker with a grate area of 100 sq ft; a model of one of the 515,000 lb per hour water-tube boiler units being supplied to Drakelow power station of the B.E.A.; a No. 3 "Impax" pulveriser; a 3 sq ft laboratory size rotary vacuum filter: a Vacseal rubber-lined pump for pumping abrasive materials and a scale model

Below, left, is the well-styled "Servis" washing machine by Wilkins and Mitchell, and on the right the Burco wash boiler Type E840

(½ in. to the foot) of a gravity bucket conveyor handling coal at 200 tons/hr. Birmingham, D.617/516.

I.T.D. Ltd.

Several fork lift trucks and material handling equipment can be seen at this outdoor stand. The "Stacatruc" both in its i.c. and battery driven form is playing an important part in saving handling costs at the present time. One of the more important problems in the battery driven version is to reduce the time spent in battery changing where the trucks are in continuous use. A new special battery change trolley has been developed which enables a transfer of charged and discharged batteries to be carried out in a matter of seconds. Among ancilliary gear, the Rodman Grab device, which avoids the use of pallets is of considerable interest. Birmingham, 1356.

Jenson and Nicholson Ltd.

Television sets, electric motors and refrigerators are amongst the items for which J. and N. finishes are used, and which are displayed on this stand. Special items for the electrical industry are "solventless" impregnating varnish, and other types of insulating and impregnating varnishes. Birmingham, B.414/515.

Johnson and Phillips Ltd.

Trinal is the name of a new range of circuit-breakers which are being exhibited for the first time. These breakers are available in single break arc-controlled form for use up to 250 MVA at 6·6 and 11 kV, while in the plain break design ratings are 150 MVA at 6·6 and 11 kV, 100 MVA at 3·3 kV and 37·5 MVA at 600 V. The former type is in compound-filled and the latter in air-insulated metal-clad housing. Another new exhibit is a metal-clad-fuse-switch unit which has an oil switch backed by cartridge fuses, and is suitable for 11 kV systems with 250 MVA fault level. Birmingham, C.403.

Wadkin grouting machine powered by B.T.H. high-speed motor

Keith Blackman Ltd.

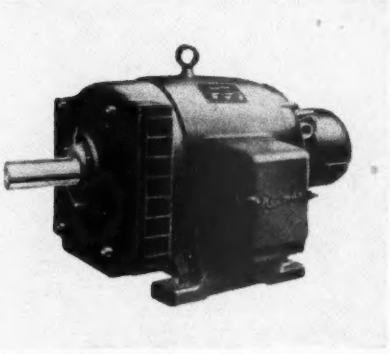
"Tornado" fans and blowers of all types are well in evidence at this stand. Apart from the special applications of these fans, the firm also manufactures unit and battery heaters for workshops and factories. Birmingham D.755/654.

Kenwood Electrics Ltd.

Domestic and catering appliances are exemplified by two main items, the Kenwood "Electric Chef" and the Chef Major. The former is now being marketed successfully in many countries where competition exists in its severest form. This item is a domestic mixer of remarkable versatility and with all its accessories can perform virtually every function of food preparation required in the domestic kitchen.

On the commercial cooking side the Kenwood Chef Major, first shown at the Hotel, Restaurant and Catering Exhibition, fills a long-existing need. This mixer is the first commercial catering aid which incorporates a liquidising unit. Additional attachments now in course of development will enable the appliance to carry out potato peeling and chipping, vegetable dicing, grating and shredding, slicing, coffee grinding, and juice separation. Birmingham, C.313/212.

One of the range of Newman slip-ring motors



Langley London, Ltd.

The display here consists of mica processed in all shapes, Micanite and Langboro laminated plastic tubes and stampings, and Langboro Peerless mica plate. These are shown as a collection of essential components for the radio and electrical industries including a range of the new insulating materials. Birmingham, C.226.

Lawler Ayers and Co.

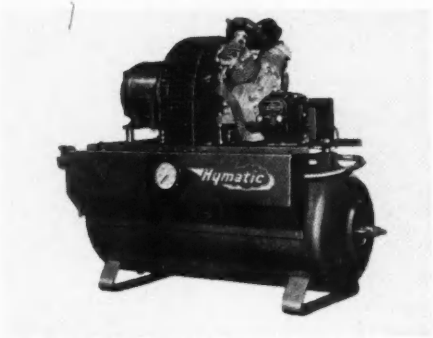
Pipe-bending machinery will be shown, suitable for bending in the cold state copper tube or electrician's conduit. Among the cutting tools are the LACO specialised range, incorporating a slate and asbestos cutter and a hand-operated cutter for corrugated asbestos. Demonstrators will be available for showing the operation and handling of these tools. Birmingham, D.104.

Legg (Industries) Ltd.

Owing to a severe fire at the works, the exhibits have been reduced only to charging rectifiers for battery vehicles. Normally transformers up to 150 kVA and rectifier equipment for all purposes would have been included. Birmingham, C.325.

Londex Ltd.

Among the many examples of relays and switches shown by Londex are several items of interest. The type LF relay has been housed in a new style pressed steel case for industrial use; a new relay contactor rated at 15 amps with up to five main contacts and two changeover auxiliary contacts has



The Hymatic I.S.10X compressor set

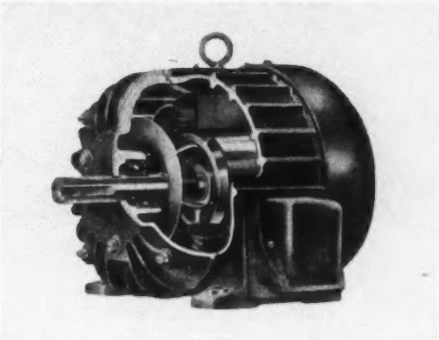
been produced. A busbar relay for overload protection has just been designed, and a light-integrating timer has been developed for photo-mechanical reproduction work. Birmingham, C.722.

London Elec. Wire Co. and Smiths Ltd.

The London Electric Wire Co. and Smiths Ltd., and its associated companies—Frederick Smith and Co., The Liverpool Electric Cable Co. and Vactite Wire Co.—are displaying bare and insulated conductors for all electrical purposes. These include the well-known Lewcos products, Lewmex, Lewmexglass and Lewbestos insulated wires and strips, "Anacos" bare copper and copper alloy wires, strips, strand, sections and forgings. Special rubber and paper insulated cables for use in mines, quarries, ships, factories, railways, etc., are included as well as domestic flexibles. Special wires are the "Eureka" and "Vacrom" resistance wires and tapes, molybdenum rods, wires and tapes, and wires for the lamp and radio valve industries. Birmingham, C.717.

Lorival Plastics

Among the plastic and ebonite moulded components on show are Lorival mouldings produced for many different industries. Careful design and selection of the right materials are exemplified by the phenolic handles moulded for the "Creda" electric kettle and the "Halo" iron. A group of pulleys incorporating "moulded-in" ball bearings



The cooling surfaces of the totally enclosed Brook motor are well shown here

and produced in high-shock resisting material for SKEFCO represent the Lorival contribution to the aircraft industry. Birmingham, C.618.

Martindale Electric Co. Ltd.

The full range of electrical maintenance equipment, manufactured by the firm is demonstrated. This includes Corumstones, portable blowers, mica undercutters, voltage testers, dust masks, industrial vacuum cleaners and flexible shaft tools. A new item of interest is a bench-type undercutter which can take armatures from the smallest size up to 10 in. dia and commutators up to 6 in. dia. Birmingham, C.734.

William McGeoch and Co., Ltd.

The extensive range of accessories includes decorative, commercial, industrial and ships' lighting fittings, watertight plugs and sockets, open-type switchgear, indicator fittings and gang iron-clad switches. Birmingham, C.515.

McKechnie Bros. Ltd.

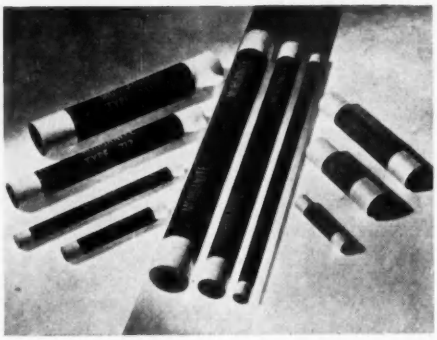
Among the large selection taken from the wide range of non-ferrous extrusions for which this firm is known are aluminium bronze extruded rods to various D.T.D. specifications. These high strength alloys have outstanding resistance to corrosion and wear, and are used in jet engine components. Other items include special welding rods, brass wire, antifriction metals, alloys and special metals. Birmingham, D.315.

Mercury Discharge Lighting Co.

On this stand may be seen a considerable range of fluorescent lighting fittings and accessories, including control equipment. Overseas friends will be particularly welcome. Birmingham, C.109.

Metropolitan Vickers Elec. Co.

Selected items, representing various facets of the range of manufacturing capacity of the firm are shown this year. These include the h.p. rotor for the 60 MW turbine to be installed in Chadderton Generating Station of the B.E.A.; an oil circuit



A selection of Morganite resistors is shown in the picture on the left

breaker type LG3CS/66 rated at 65 kV 800 amp 1,000 MVA; a 50 h.p. totally enclosed steelworks auxiliary motor, a controlled electronic drive; a model of the 3,000 h.p. gas turbo-electric loco for British railways and a selection of velometers. A display panel features the Company's apprenticeship training scheme. Birmingham, C.510.

Metway Electrical Industries Ltd.

The standard products—elements and spirals, conduit fittings, porcelain accessories, immersion heaters and electric kettles—will be shown. A new item is the 909 kettle connector which has many interesting features. Birmingham, C.225/102.

Monsanto Chemicals Ltd.

Special chemicals of interest to the foundry trade and engineering industry are the "Silesters" and "Syton C" silica compounds which are used as bonding agents in casting processes. The purity of the bond makes Silester-bonded refractories particularly valuable in the electrical field. Selected "Aroclors" which are chlorinated diphenyls, are effective incombustible lubricants for use in high-pressure compressors, and are also useful as heat exchange media. Olympia, C.9/10.

Morgan Crucible

The electrical uses of carbon are exemplified by the range of "Morganite" brushes shown together with brush holders of all types, brush bedding stones and commutator grinding stones. The most recent product in the Morganite range is the metal carbon contact tip for controller and contactor applications. These reduce the need for periodic lubrication and also prevent the welding of contacts in drum controllers, contactors and other types of switchgear. Anti-friction carbon components include crane current collectors and trolley bus collector inserts. The resistor side is represented by ceramic-bonded carbon resistors among which is a new item, the "Megistor", with a range between 100 and 1,000,000 megohms. To ensure stability these resistors are sealed in an evacuated glass envelope which is coated with a water-repellent lacquer. A range of potentiometers is also on view. Birmingham, D.305/204.

Revo's vertical fluorescent lamp street lighting fitting possesses both grace and dignity combined with economy and efficiency

A. C. Morrison (Engineers) Ltd.

The well known Morrison electric generating sets for farm, home, shop, factory and marine use, in capacities from 250 W to 40 kVA will be shown this year. Standard plants are supplied in voltages of 230, s-ph, 50c/s; 110, s-ph, 60 c/s, and 230/400, 3-ph, 50 c/s, but other voltages are available. From 250 W to 2 kW, petrol engines are used. Larger sizes run on Diesel fuel. Birmingham, 1338.

Wm. Moss and Sons

The "Beanstalk," a hydraulically operated mobile rising platform allows access to working heights up to maxima between 18 and 30 ft, according to the model. Operated by one man, and collapsible into a small space it is a most useful factory maintenance adjunct. Birmingham, D.738.

Nettle Accessories Ltd.

New items, being shown for the first time are a 5 amp, 3-pin weatherproof rubber cable coupler—in the near future this will be produced in three further sizes, namely, 5 amp, 4-pin; 2 amp, 3-pin; and 15 amp, 3-pin—and a 3-pin, 13 amp, 3-way socket outlet adaptor which is both fused and shuttered. Birmingham, C.309.

Nevilles (Liverpool) Ltd.

Coil winding machines are being shown by this firm—a subsidiary of Aeronautical and General Instruments Ltd. These range from the simple

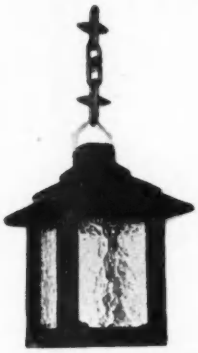
"Hamilton" hand winder, up to the comprehensive "Montreal" which can handle wire gauges as diverse as 11 and 47 s.w.g. for coils from $\frac{1}{16}$ in. up to 12 in. long with a maximum diameter of 12 in. Several heavy duty and special machines are also included. Birmingham, C.505.

Newman Industries Ltd.

It has been found possible to exhibit for the first time two of the latest developments: a totally enclosed slip ring motor in prototype form, and the "Newphase" electric motor for "star-delta" starting on a single-phase supply. Full details of these motors are available on the stand. Birmingham, C.518.

Newton Bros. (Derby) Ltd.

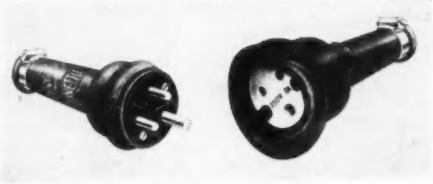
Special electrical products covering a wide range of electrical equipment are being exhibited at this stand. These include automatic pile voltage regulators, rotary transformers and converters, high frequency alternators, spinning motors for the rayon industry and lightweight generators for aircraft duties. Birmingham, C.718.



A pendant oak lighting fitting by Herman Smith

Newton Victor Ltd.

X-ray equipment for industrial purposes is on view, chief interest being centred on practical working demonstrations of fluoroscopic examination with the "Raymax 140" unit. This is designed for continuous operation from 30 to 140 kVp. and is capable of producing first-class radiographs of steel section up to $1\frac{1}{4}$ in. thickness. In addition to the fixed version of the Raymax 140, as designed for permanent installation in the inspection department or laboratory, is a completely self-contained mobile model in which the Raymax 140 X-ray generator, tube unit and control are mounted on a trolley. Birmingham, C.709.



Ozalid Co. Ltd.

Once again, the main feature is the "Duplex" Ozaprinter combined photoprinting and dry developing machine. This has gained great popularity since last year's Fair. In addition, there is the "Ozamaster," a combined printing and developing machine for dealing with a large volume print output. This provides for automatic separation of the original from the sensitized material, and automatic transmission of the exposed print to the developing section of the machine. Birmingham, D.707/606.

P.A.M. Ltd.

The new Tem-Con humidistat is being shown in conjunction with Humidity Control Ltd., who are sharing the stand and exhibiting the "Humijet" unit humidifier. Research work on the problems of temperature control in plastics extruders is exemplified by the actual test gear used. Technical representatives are available to demonstrate the methods adopted. Birmingham, C.505.

Partridge, Wilson and Co.

"Davenset" products are represented by power transformers up to 100 kVA, mercury arc rectifying equipment up to 100 kW, selenium metal rectifiers and battery charging equipments. The home chargers for the maintenance of automobile and wireless batteries, the plastic moulded high discharge battery test, the low voltage moulded rubber handlamp and the low voltage lighting transformer are all of interest. An increasingly popular item is the automatic pump, which will operate in a submerged condition and requires no elaborate installation. Birmingham, C.305.

Permali Ltd.

The physical characteristics of "Permali" insulating material make it particularly suitable for use where high stresses are encountered. Exhibits on the stand illustrate the use of "Permali" in heavy electrical plant. A 132 kV o.c.b. contact assembly shows the application of "Permali" to this extremely onerous duty. This has been loaned by Metropolitan Vickers Electrical Co. Ltd. Another item is a line trap choke coil by G.E.C., in which both top and bottom plates and all vertical support members are made of "Permali." Birmingham, C.220.

The Power Centre Ltd.

Of particular interest among the numerous examples of distribution equipment and gear, are

New Day's flush socket and fused plug is shown right together with the Nettle three-pin 5-amp waterproof rubber coupler on the left

the cable trunking sections for special application. By the use of internal fillets, these may be compartmented along the run for the segregation of various circuits. A cable-tap system, utilising standard trunking, has been developed as an alternative to busbar trunking where the total load does not exceed 100 amps. Birmingham, C.504.

Premier Electric Heaters Ltd.

Showing for the first time is a new Premier fire styled on modern lines. Features of this are a cool body for handling; sparkling stainless reflector to give an efficient heat distribution; easily removable fire guard, and high physical stability. The other domestic appliances include fires, kettles, irons, toasters, sterilisers and so on. A limited supply of Premier "Pylon" kettles and percolators in heavy gauge copper bodies finished in chromium plate are available for export only. Birmingham, C.302.

Pritchett and Gold and E.P.S. Ltd.

Emergency lighting equipment is prominently featured this year. The dominant exhibit is an automatic non-maintained, junior type emergency lighting apparatus with its associated battery of 14 Closed Top cells. This has been designed for use in cottage hospitals, nursing homes, small halls, and so on. The remaining portion of the stand is occupied by a selection of P and G batteries produced for all modern d.c. duties associated with the generation, distribution and use of electricity. Birmingham, C.702.

Pyrotenax Ltd.

Owing to the scarcity of raw materials, in particular of non-ferrous metals, Pyrotenax have redesigned part of their standard range of fireproof cables to make extended use of the copper available. Thus the new range of "Lighting Cables" have much the same carrying capacity as the cables which they replace, but with smaller overall diameter, which is instrumental, both in saving material and in reducing price. The inherent properties of Pyrotenax Cable make it possible to develop heating cables for many purposes and a range of these has now become available. Birmingham, C.720.

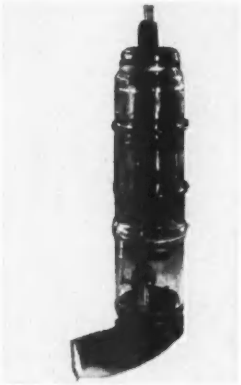
The all-electric spray gun made by E.G.A. Developments, moulding by British Moulded Plastics Ltd.

Rapid Magnetic Machines Ltd.

Special emphasis is placed on a new range of permanent magnet clutches and plate-type separators. This equipment, incorporating Alnico or Alcomax permanent magnets, has been designed to meet the exacting requirements of the food, textile, confectionery, plastics and other industries. Textile magnets, separators, electro-magnetic clutches and brakes and lifting magnets are also shown. Birmingham, C.421.

The Rawlplug Co. Ltd.

Technical representatives on the stand concentrate on giving advice and practical demonstrations of the use of Rawlplug fixing devices and hole-boring tools. The method of using the Rawlbolt Metal Expansion Bolt which eliminates grouting in concrete is of considerable interest. Other fixings are Bolt Anchors and "Cement In Sockets." The Rawlnut is unusual in that being made of rubber it gives a shakeproof, waterproof, airtight and insulating fixing ideal for car or caravan work. Among the tools are the "Durium" tipped rotary drills, and the improved "Drill Hammer." Birmingham, C.707.



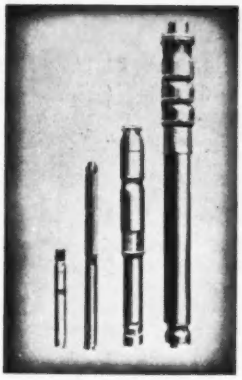
Single anode glass tube mercury pool rectifier for high-power radio transmitters (English Electric)

Revo Electric Co. Ltd.

The equipment by Revo, consisting of street lighting columns in steel, cast iron and concrete, including the latest "Scopas" and "Angelo" columns in polished concrete, is displayed at the various entrances to the Fair. Lanterns for use with tungsten, sodium vapour and mercury vapour lamps are mounted on the columns. Birmingham, Outdoor.

The Rheostatic Co. Ltd.

"Satchwell" electrical thermostats for the control of room duct oven and liquid temperatures are exhibited together with motorised valves for steam and hot water, flame failure devices and controls for oil burners, and automatic stokers. In the field of water heating are a range of two-



A selection from the range of Beresford submersible electric pumps

rate modulating valves for low-pressure heating systems and a range of straight - through modulating valves for use with steam or hot water. Both types are electrically operated. "Service" and "Satchwell" resistors are also shown for traction and all heavy industrial applications. Birmingham, C.500.

The Riley Stoker Company Ltd.

Principal exhibits are a Riley Type "T" chain grate stoker for firing horizontal shell type boilers; a Riley automatic kiln stoker for top fired brick kilns, and a range of Syntron electric, vibrating and feeding equipment. New items in the latter category are the Syntron Spiral feeder and the Syntron dual-magnet feeder. Birmingham, D.617/516.

Ross Courtney and Co. Ltd.

Fixings and fastenings both for electrical cables and terminations and for a great variety of other uses are made by the company. The patented "Petramag" is a thief-proof device for fitting to motor vehicles. Both ignition and fuel supply are turned off simultaneously by the operation of one key. Birmingham, C.505.

Rozalex Ltd.

Rozalex barrier preparations for the protection of the skin against all classes of irritant materials used in industry are featured. The Rex dispenser, an appliance developed to provide an economical and uncontaminated supply of Rozalex to the worker whenever required will also be shown. Birmingham, D.706.

Runbaken Ltd.

In addition to the existing range of electrical and automobile ignition accessories made by Runbaken, two items are being shown for the first time this year. One of these, the "Echo" armature tester has been developed for detecting faults in all types of armatures, stators and field coils; the other, the "Overnight" battery charger 5-amp model, contains automatic tapering facilities which reduce the charging rate as the battery comes up to full charge. Birmingham, C.730.

Joseph Sankey and Sons Ltd.

The Bankfield Works is showing a selection of laminations for transformers, motors, generators and so on made from the various brands of electrical quality steel produced at the Wolverhampton Rolling Mills. Birmingham, C.624.

Sciaky Welding Machines Ltd.

The outstanding exhibit is the recently developed heavy duty projection welding machine Type P.A.D. 100 nominally rated at 100 kVA. Among the special features of interest on this plant is the transformer arrangement which is designed to give a high secondary current output for an economical mains loading. It is claimed that this 100 kVA machine has a performance equivalent to the conventional 300 kVA unit. Birmingham, C.222.

Senior Economisers Ltd.

Economisers shown range from atmospheric pressures to over 2,000 lb/sq in. In the central position is a full size H-tube economiser as used in industrial plants with pressures up to 550 lb/sq in. An assembly of the Senior Welded economiser as used in central power stations is also shown together with the Senior Twintube unit. All these are fitted with gills to form straight uniform gas passages and give clean heating surfaces. Built into the stand is an animated picture to show the position and operation of an H-tube economiser in a water tube boiler. Birmingham, D.239.

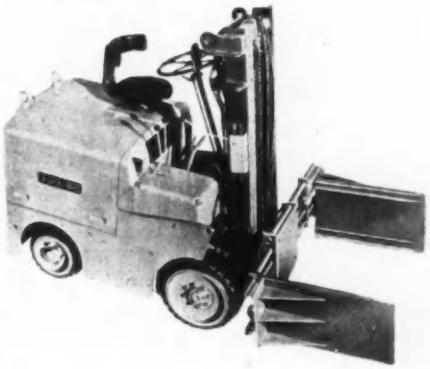
Serck Tubes Ltd.

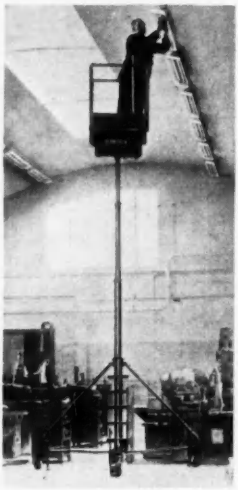
The main display consists of a range of solid drawn cut copper and copper alloy tubing from $\frac{1}{16}$ in. o.d. to $2\frac{1}{2}$ in. o.d. arranged on a large slowly revolving table. Messrs. Serck Radiators Ltd., an associated company, are showing a number of heat exchange units. Birmingham, D.618.

Hermann Smith (Smithlite) Ltd.

Displayed here for the first time is a new range of oak lighting units, available in both pendant and bracket form. In addition, there is the usual comprehensive range of incandescent and fluorescent

The battery-powered I.T.D Stacatruc





The "Beanstalk" by Wm. Moss and Sons

lighting fittings for industrial, commercial and domestic use, together with ancillary gear. Birmingham, C.306.

Southern Instruments Ltd.

Two items of particular interest are the ME 122 engine indicator, for investigations into the performance and operation of any i.c. engine or compressor, and the M 950 universal Oscilloscope. The former uses a high-quality double-gun cathode-ray tube and uses condenser resistance, electro-magnetic or photo-electric pick-ups. Direct vision or camera recording is included. The oscilloscope, M 950, is designed to measure physical quantities by the use of external transducers. Birmingham, C.107.

Spraytex Ltd.

The Ega all-electric airless spray gun which utilises centrifugal force to throw out the atomised paint spray is again being shown. This gun has the advantage of avoiding the mist and bounce inevitably associated with the compressor operated gun. An unusual application of electrostatics is in the application of flock evenly to adhesive coated articles. Birmingham, B.205.

Spiral Tube and Components Ltd.

A full-scale demonstration of unit heaters operating from fully automatic low pressure steam heating system takes pride of place. Other heating units include the new vertical discharge units for high level mounting, and the Spiraluxe small fan heaters in 2 and 3 kW models. Further products are the Mark III unit heaters operated from steam, hot water or electricity and Mark I air heater and cooler batteries used for air conditioning installations and process plant. Diesel engine coolers and refrigeration coils are also made. Birmingham, D.710.

Standard Telephones and Cables Ltd.

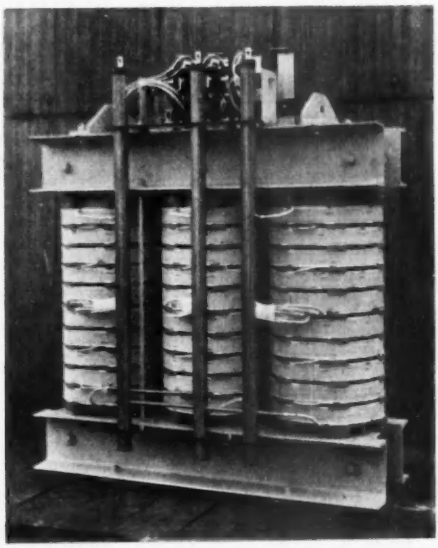
Power engineering is the main subject dealt with by S. T. and C. Co. in their display this year. A remote-control system is shown comprising a Common Diagram control desk designed to cater for twenty substations with up to ten low-voltage (6·6 kV) feeder breakers each, together with other equipment. The facilities provided include control and indication of all circuit breakers, indication of isolators, "on demand" meter readings of all vital points, centralised alarm indication and transformer tap control and indication. Rectifiers for high-voltage work are illustrated by a transportable SenTerCel 35 kV cable test equipment. Power factor correction capacitors and power cable and accessories complete the exhibit in this field. Communication equipment is represented by "Standard" V.H.F. single-channel A.M. radiotelephone Type HTR 10. Birmingham, C.621/520.

Sterling Cable Co. Ltd.

Limitations on the availability of copper have resulted in the production of a range of cables with aluminium conductors which is represented on this stand. Additionally there are cables made to American specifications, a line which has been included in general production for the past few years. Birmingham, C.308.

Stewarts and Lloyds Ltd.

Pipes and tubes of all types for all purposes are being shown at the three stands occupied by Stewarts and Lloyds and their subsidiary and associated companies. A special display is being made of electric resistance weld boiler tubes (to B.S. 1654). Tubes made by this process are in all respects equal to and in some respects superior to seamless tubes and have been approved by Lloyd's Register of Shipping and the Ministry of Transport for use in both smoke and water tube boilers. Fabricated tubular steelwork is being displayed by Tubewrights Ltd.; hydraulic joints, fittings and couplings by the Victaulic Co.; and gunmetal valves and fittings by John Russell and Co. Birmingham, D.511/408, B.404, Outdoor.



Brush distribution transformer to show windings

Tenaplas (Sales) Ltd.

An innovation in the covering of copper wire with plastic is the use of multi-coloured p.v.c. to give a great increase in the range of identification colours. Other recent developments are the covering of rods and tubes with extruded p.v.c. tubing by a chemical process, and polythene tubing ideally suited for carrying water supplies. Earls Court, V.

John Thompson, Ltd.

Perhaps the most interesting item shown by the John Thompson group of companies is the new chain grate mechanical stoker for application to shell boilers. The main feature of this is the method of supporting the grate surface which does not transmit any load. John Thompson (Wolverhampton) are showing a welded stainless-steel evaporator body 12 ft high and 5 ft diameter, while John Thompson Water Tube Boilers have on the stand a waste heat boiler for utilising exhaust diesel gases, Birmingham, D.521/418.

Tudor Accumulator Co.

Covering almost the entire field of storage battery applications in industry, exhibits on the stand include a switch-tripping unit, a Safetylyte automatic emergency lighting set and a range of cells for all stationary, traction and marine duties. Completing the exhibits are display cabinets showing in detail the points of design and construction incorporated in the cells, and a group of plates, separators and components. Birmingham, C.114.

Walsall Conduits Ltd.

Briefly, the exhibits are complete new designs of accessories providing for the incorporation of all types of a.c. switches, sockets, switch sockets, etc., in a standard box to B.S.I. requirements. Special splayed base fittings are particularly suitable for hospitals and embody "Walsall" sparkless mercury switches and switched socket outlets. Flameproof equipment for use in hazardous areas, underfloor duct and cable trunking systems and new additions to the range of "Walsall" ironclad gear are also included. Birmingham, C.715.

Thos. W. Ward

The exhibit is designed to show the activities of the various companies in the group. From the parent company are the "Eldair" range of sheet metal manipulating machines, including guillotine, press brake and shears. Birmingham 637/536.

Westinghouse Brake and Signal

Essential brake, signalling and rectifier interests are represented. In the last named field, is a demonstration showing the conversion of a single-phase incoming supply to 3-phase by static phase convertors. This three-phase supply is then used to operate a 7·5 volt 500 amp plating rectifier with controller. Several other rectifier sets will be on view, among them units for "Cathodic" protection of buried pipes and other underground structures. Birmingham, C.508.

Bulpitt's Swan Brand electric heating pad

Wilkins and Mitchell Ltd.

Prominently featured is the Cabinet De Luxe "Servis" washing machine which at the present moment is reserved for export only. This model has an external appearance specially styled for the dollar market, particularly in Canada. A new feature which can be purchased as an extra item is a plastic table top which fits over the top of the cabinet to give an extra two square feet of table room in a small kitchen. A "Superheat" version is available in which a 3 kW heating element has been incorporated in the base of the tub for heating the washing water. Birmingham, C.517.

Wolf Electric Tools

The well-known electric tools are being exhibited and demonstrated. For home use is the Wolf-Cub constructor equipment, whereby a Wolf-Cub portable drill can be used for turning, sawing, polishing, grinding or sanding. Birmingham, C.603.

Workman Reed and Co.

"Beacon" pumping sets and generating sets will again be shown this year. They include the a.c. and d.c. Baby Beacon units, the popular 3 kVA fully automatic and electric starting Diesel a.c. sets, and Diesel pumping sets. New additions are the Super Beacon "R" 7 kVA models for 230 V and a 6 kVA 230/400 V Diesel unit. Birmingham, 1331a/1230a.

Yorkshire Switchgear and Eng. Co.

Three principal items comprise the display. The first is a 3-panel IV10 metalclad switchboard made up of two fault-making isolators and one spring-operated 250 MVA 11kV outdoor type circuit-breaker. The second item is a 3-panel board comprising a normal load make/break ring mains unit, one front mounting instrument panel unit and one non-automatic fused isolator for indoor use. The last item is a 22 kV oil circuit-breaker with a rating of 250 MVA. Birmingham, C.419.

Notes on Wiring
by MEGOHM

Catenary Cable Systems

Successful Installations based on Careful Planning

SHORTAGES and difficulties in obtaining equipment and accessories that a little while ago could be had for the asking has brought to the fore new and maybe progressive ideas for installation work.

Recently I had the opportunity of looking over installation work in progress at new garages for the London Transport Executive where the wiring for the lighting installations are being carried out by the use of a catenary cable system, and also at a large Government Repair Depot where the catenary cable system is being used in place of an overhead busbar system for supply to motorised machine tools of powers varying from 1 to 30 horse power, and for supplies to portable electrically-operated hand tools. The catenary cable consists of a high tensile galvanised steel strand around which v.i.r. cores manufactured to British Standard specifications are laid helically. Suitable fillings are inserted between the v.i.r. cores and the whole assembly is encased in braid saturated with a lead base compound and waxed over all to provide a waterproof finish. The finish ensures a long life because the lead base compound hardens to form a permanent covering round the cable.

Lighting Installation

The general layout for the lighting installations in the garages was tidy and pleasing and since the fluorescent lighting fittings were fixed close to the catenary cable boxes, the forest of conduit down drops usually associated with a conduit installation for this type of work has been eliminated and of course a considerable saving in costs, in this connection alone, has been achieved. The electrician in charge said that for this type of work he found the catenary cable system good, and there was a considerable labour saving compared with similar installations carried out with v.i.r. cables enclosed in screwed conduit. Another point he made was that, by using the catenary cable system, there was no "if" that the earth continuity of the system would be satisfactory, since the question of high resistance joints could not arise as in the case of a conduit system. The fluorescent lighting fittings suspended from the cable boxes were of 1 and 2-lamp types and the fittings positioned over the washing areas were totally enclosed and subjected to an internal pressure of approximately 5 lb per square inch which has been found most suitable for installing in such positions.

The catenary cable system in the course of erection at the Government Repair Depot for supplies to motorised machine tools comprised a 4-core 19/·064 cable which was run directly over the machines with down drops to the isolators on the machine tools. The work here was well planned and presented a workmanlike job. The overhead run of catenary cable for supplies to hanging sockets into which portable electric hand tools could be plugged was installed on similar lines but the cross section of the conductor here was reduced. This simple arrangement is effective, quickly installed and there is no doubt that the cost of the installation, compared with an overhead metal busbar system, is very much lower.

The cable boxes for use on the catenary cable system comprise a cast aluminium shell into which is fitted substantial steel anchor plates. Connections to the conductors can be made by the use of insulated line taps or standard single pole connectors.

The success of a catenary cable system lies in the careful planning of the layout in relation to the building construction and the initiative of the practical foreman in overcoming the minor site difficulties which cannot always be seen or appreciated from structural and architectural drawings. Careful planning of an installation and if necessary consultation with the manufacturer prior to commencement of work on site should eliminate minor errors in handling and erection. In general erection is simple, but like many simple ideas if not dealt with in the correct sequence difficulties in installation may arise. I would suggest to manufacturers that a short descriptive instruction course for erection and connection of boxes, etc., would be of considerable help to contractors and electricians.

The principal advantage of this system of wiring is that it can be installed rapidly even in areas where other work is taking place, with the minimum of expenditure of site labour.

Our readers' views ...

Brass Failure

REFERRING to your correspondent "H.M.'s" note on page 754 entitled "Troubles with Brass," I wonder if there is any significance in the equipment being connected with a refrigerator. Brass is often affected by corrosive fumes penetrating between the crystals and causing the material to disintegrate. Ammonia which is a commonly used refrigerant is especially powerful in this respect. The cure is to put the equipment containing brass out of reach of the ammonia fumes or else not to use brass at all. The trouble was not due to the original metal being crystalline because all metal is crystalline.

B. Jubb

LONDON S.E.25

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Blasting for Line Erection

BRIEFLY in reply to Mr. Leonard I should like to emphasise that electrical detonation is a simple operation, that it can be applied to blasting pole holes or cable trenches and that it removes one element of danger from an inherently dangerous task.

In the mishap to which I referred the operator having lit the fuse turned away, slipped and suffered a bad sprain. Whilst so handicapped and having to move to a safe position over difficult ground in a limited time, he fell again and injured himself more severely.

Blasting in soft soil is another matter. North American methods of blasting and earth drilling are naturally suited to conditions which include large tracts of uniform soil deposits in addition to the more publicised wide open spaces. One effect of this may be seen in the large demand which exists in some States for light jib-suspended electrically or pneumatically driven augers equipped with torsion forks only. Such tools are not generally suitable for use in this country.

I have blasted in water laden soil using the method I described and the results which are to be obtained are readily ascertainable by any person permitted to buy explosives who can also obtain access to a suitable large field.

With regard to tractor mobility, the ground pressure exerted by a tracklayer is about half the foot pressure of an average weight man whilst walking. Water in itself is not a significant obstacle unless it can interfere with the running of the prime mover. Oozy mud in depth is most likely to bog-down the machine which can usually carry on until the tracks are half buried. Under worse conditions the pole load may be transferred to a tracklaying trailer or the winch may be used to pull the machine in and out of position.

I cannot see why it is suggested that amateurs be excluded from multi-shot firing and not from single shot firing. There is a good case for excluding them from both of these comparatively risky jobs.

G. R. Lomax

HAVANT A.M.I.E.E.

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Lift Controllers

WITH reference to the article on Lift Controllers dated April 10, I feel I cannot agree with the writer's opinion that 90% of faults on lifts are due to the control panel.

It has been found from experience that the majority of minor faults on lifts are due to the gates and electrical locks. On goods lifts the latter are generally subjected to rough treatment by the operators, and soon become damaged and out of adjustment. Quite a number of faults are due to brake slip thus causing the lift car to overtravel the desired floor, and operate the ultimate main limit. Modern lift controllers in which the majority of contacts are copper to carbon are so accurately designed that once installed correctly seldom give trouble during their working life.

The general practice of lift manufacturers is to fit the control panel within easy reach of the motor and gear box, so that all main control gear is confined in one area which enables maintenance to be carried out efficiently.

If the controller was fitted as suggested away from the gear house it would be found that with the majority of installations this would be impracticable, and observation of the lift gear and brake wheel operating the lift from the controller for maintenance purposes would be impossible, and consequently the cost of repairs would be increased.

Philip S. Hussey

BRISTOL, 6

Converters for H.V.D.C.

Design of Valves must concentrate on reliable operation

IF high voltage direct current transmission is to prove practicable, reliable trouble-free invertors will have to be developed. The principles on which such work may be based were discussed last week during an I.E.E. supply section meeting, at which DR. H. VON BERTELE, DR.ING., DIPL.ING., A.M.I.E.E., and MR. R. TUCKER read a paper entitled "The design of high power mercury arc convertors," dealing with mercury arc convertors for operation at 200 kV and above.

In the introductory section of the paper the idea is developed that the inversion of d.c. energy into a.c. energy follows the principle of the transformer. Current flow in opposition to the induced e.m.f. results in the acceptance of energy; i.e., inversion. To force d.c. energy back into the a.c. side of the convertor by means of valves, three conditions must be satisfied : (*a*) The applied voltage must exceed the mean induced e.m.f. of the invertor transformer, the latter being a function of transformer ratio as well as of firing angle; (*b*) Commutation from one anode to the next, at the required frequency, must be effected by synchronised reactive power on the a.c. side; (*c*) Security against current flow in the rectifier direction must be provided.

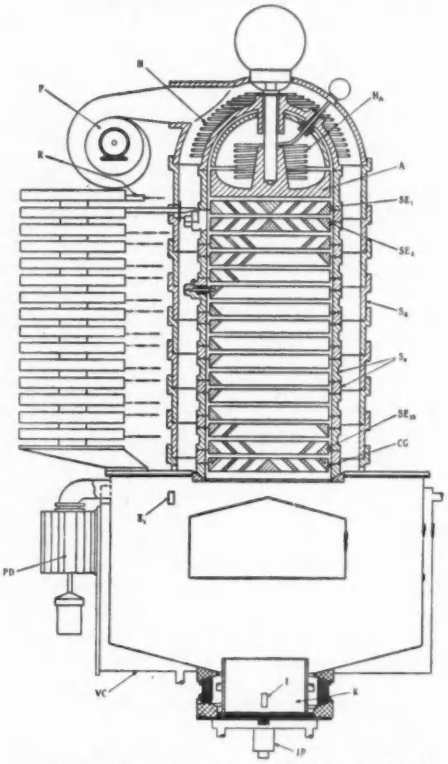
Security required in condition (*c*) is an outstanding problem, and the author suggests that in spite of much published information on h.v.d.c. problems, there are, few indications of the valve stresses in h.v. convertors, and very little information on the mechanism and design of the valves themselves has been published.

Valve Stresses

All mercury arc rectifiers have stresses imposed depending on the waveshape and amplitude of the anode voltage applied, and on the excessive current densities with respect to the vapour density present. Invertor operation adds a third type of stress associated with the risk of loss of grid control when the anode becomes positive, while further stresses are introduced by high voltage operation with the risk of transients due to stray capacitances and inductances. Details of these dangers are investigated in the paper.

For voltages above 20 kV, some form of series connection of valves is necessary, and since the voltage stresses in convertors using centre point connections are twice those of bridge connections, the latter has been used in experiments so far. To avoid impracticable complications and excessive associated capacitance, the number of valves used has to be kept down, and the general trend of design has been to give higher voltage-withstand capacities and lower auxiliary capacitances. Voltage subdivision may be forced on a series of gaps in a common envelope. Apart from breakdown problems, the maintenance of an even voltage

250 kV, 1,000-amp (peak) single-anode valve with heat-resisting sectionalised envelope enclosing sub-divided anode system



A—Anode. H_A—Anode heater. SE_1-SF_{15} Subdividing electrodes. CG—Control grid. E_1—Upper-level exciters. K—Cathode system. IP—Plunger ignition system. PD—Diffusion pump VC—Fluid-cooled vapour chamber. I—Ignition electrode. S_e—Sectionalised anode-space envelope. S_d—Sectionalised hot-air duct. H—Space heater. F—Hot-air circulating fan. Cp—Voltage-divider capacitors. R—Resistors connected to sub-dividing electrodes.

distribution is important, as is the elimination of interaction between adjacent gaps during the locking interval, and the securing of undelayed sequential firing of electrodes in transferring the discharge from cathode to anode.

Simple inductive or capacitative voltage dividers are unsuitable, and even the resistive divider has troubles associated with its stray capacitances. The best form is probably a chain of capacitors with resistors in circuit between them. In view of the stray capacitances bound to each valve, it seems unlikely that satisfactory operation above 100 kV will ever be achieved with series-connected single-stage valves.

The main features governing the voltage withstanding capacity of a gap, subject to the conditions of an inhibited discharge, are vapour density, degree of ionisation present, and gap widths. Mercury vapour pressures of 2-5 microns, gap widths of about 1·5 cm and operating ionisation of some 10^{12} ions/cm^3 at current densities of 1 amp/cm^2 yield breakdown thresholds of 25 kV per gap in anode systems. Various dangers of instability exist, including those traceable to ionisation and bombardment effects, and to the spluttering of electrodes. Some form of baffle arrangement is required to prevent the continued acceleration of electrodes through a series of gaps.

The exact process of firing anodes enclosed in sleeves, whether conducting or non-conducting, is not yet fully explained. The authors present a hypothesis in the present paper, but in their introduction at the London meeting they noted that some doubt had been thrown on it by recently published work.

Valve Design

Having considered theoretical principles, the authors turn to practical details of valve design. Based on a breakdown voltage of 15 kV/gap, they suggest 15 electrodes in series for a 250 kV valve, giving a safety factor of 50%. Earlier experimental valves have been unsatisfactory from the aspect of random breakdowns, but it is considered that no new or unknown phenomena have to be considered. What is necessary is that the vapour atmosphere in the anodes space must remain clean and steady; insulator boundary and surface charge effects must be minimised; and spluttered electrode material must not pile up anywhere in the anode system.

For vapour cleanliness degassing at 400°C is required, and this demands heat resisting insulating bushes and non-porous envelopes. Anode system diameter is determined by current, which for a 250 MW 250 kV system is 333 amp mean, 1,000 amp peak with 3-phase 6-pulse bridge connection. The figure shows the system suggested, the envelope of the anode system being of glass or ceramic, joined by means of glass fluxes. Wide channels must be provided in the sub-dividing electrodes, in order to secure even current distribution across the whole system. To reduce troubles from impurities, a thermal gradient falling from anode to cathode is ensured, so that the impurities may collect in the cathode space. This arrangement also reduces trouble due to condensation on the anode.

In their conclusions the authors note that the mercury vapour covertors envisaged by them are at least one order of magnitude larger than the largest hard valves developed for transmitters, but they also point out that it is hopeless to expect satisfactory results from a compromise arrangement of small valves, because secondary effects would overwhelm the basic operation.

DISCUSSION

MR. J. E. CALVERLEY (English Electric) said that he believed that engineers throughout the world were beginning more and more to realise that in the not far distant future many masses of people would depend for their amenities and standard of living on the transmission of electrical energy over long distances overland or by cable under the sea.

He said that the paper referred to the fact that random failures had now been eliminated from hard valves, wireless transmitting valves, and so on. Obviously, if it had been eliminated from that type of valve it would be eliminated from the mercury vapour valve. The authors suggested that the technique used in the transmitting valves should be adapted to mercury arc valves. He believed that was already being done. All the large manufacturers of rectifiers were also making valves and there was a fairly good interchange of technical knowledge between them.

He believed that nearly all the valves illustrated in the paper were made more than 10 years ago, and he wondered what results would be given by such valves manufacturer according to present-day technique. He also wondered whether any of the designs of high-voltage anode systems with voltage subdivision illustrated in the paper had been used under service conditions for any length of time.

MR. C. EHRENSPERGER (Brown Boveri, Switzerland) reviewed the economics of d.c. transmission. The first d.c. transmission plant would, he suggested, be designed for about 50 megawatts although this was less than the economical limit which justified d.c. Tests in his country seemed to prove that the use of series connections solved the problem of disturbance under random

conditions because the probability of simultaneous backfire was very small. His company would be ready to build the converting equipment for a first d.c. transmission system and to share part of the risk involved in such an enterprise, but it was difficult to find a power company ready to co-operate in such work.

DR. W. G. THOMPSON (General Electric) said that Fig. 19 was the crux of the whole paper. The design was built on experience gained in practice with other designs, and it seemed that they were being asked to discuss a design which had not actually been tried out in practice. He wondered how the authors were able to place such confidence in what appeared to be rather a retrograde step in the design of the grids between the anode and the cathode, particularly in respect to their sharp edges. He had grave doubts about the ultimate success of a valve of that type.

DR. J. C. READ (B.T.H.) said that one of the most important statements in the paper was that it was not practicable to connect large numbers of medium-voltage valves in series for very high-voltage work. He thought that a higher breakdown voltage than 25 kV was possible with single gaps.

MR. J. E. BOUL (English Electric) said he agreed with the conclusion of the authors that it was feasible to construct rectifiers suitable for high-voltage d.c. transmission, but the problem was one of development and it was not quite as simple as the paper seemed to imply. There was a case for the higher authorities and those planning supplies to examine their future requirements in order to advise manufacturers on whether or not there was justification for plunging into this heavy expenditure of man-hours at the present time. He felt that gaps could bear greater voltages than was suggested by the authors.

MR. H. SMETHURST (Metropolitan-Vickers) said that the authors did the British rectifier manufacturers an injustice when they said that the general run of engineers concerned with high-power rectifiers tended to pay less regard to the cleanliness of the vapour atmosphere than was wise. At least four manufacturers in this country were prepared to supply pumpless air-cooled multi-anode rectifiers with physical dimensions comparable to those illustrated in the diagram rated at 3,000 volts 1,000 amp d.c. The authors concluded that the random breakdowns on high-voltage rectifiers were caused largely by unsatisfactory manufacturing techniques. It was often difficult to say whether the designers or the manufacturing staff was at fault.

DR. F. BUSEMAN (E.R.A.) said that he had come to the conclusion that one should consider both a.c. and d.c. transmission without bias. He suggested that 250 MW was too large as a first step in invertor construction.

DR. VON BERTELE, in replying to the discussion, said that a number of speakers had asked why it was thought necessary to have three valves in series. The answer was that if one valve failed the other two valves would stand the voltage. The large dimensions for both voltage and current had been recommended in order to cover the largest power which had been considered.

NATIONAL RESEARCH

GOVERNMENT sponsored research is expanding too slowly for the needs of the country, suggests a report of the D.S.I.R. Advisory Council published recently. Both from the immediate aspect of the defence programme and the longer term view of economic requirements, there is need to "remove obstacles which stand in the way of the development of D.S.I.R. post-war plans at the necessary pace."

Specific difficulties mentioned by the Council include recruitment of staff, building and capital expenditure. Staff recruitment recently has run at a level of only 110/year, whereas a minimum of 150 is required. In the building field, the department's post-war plans included a programme whose cost at today's prices would be about £10m. Progress in this is reported as "extremely disappointing."

In their consideration of financial matters, the Council are most emphatic that no attempt should be made to hold D.S.I.R. expenditure at a fixed level. The effective planning of research must be based on reasonably firm budgetary expectations for several years ahead: it cannot be reasonably undertaken on a year to year basis.

During 1950 the Council reviewed the whole policy of grants to industrial research associations, including the principles upon which they are made and the procedure for assessing the rates of the grants. The government and industry are now jointly associated in co-operative research, and grants are made on a five-year basis, with a component proportional to industry's contribution. In the case of the many research associations formed since the war, it is considered that the grant should at first be related to the importance of the industries concerned in the national economies.

In an outspoken conclusion to their report, the Council say that the ultimate justification of D.S.I.R.'s expenditure must be found in a larger national income. The report is published by H.M. Stationery Office, as Amd. paper 8494, price 7s. 6d.

Problems and Practice IN ENGINEERING

Protecting of Spares

THE care of spare electrical plant or plant which is used only intermittently is one which is seldom given enough attention.

It is to the writer's knowledge that there was a case when an electric motor and spare armature were supplied to a customer. The spare armature was not required for many years, during which time dampness and corrosive action caused deterioration of the insulation, as a result of which the spare armature had to be rewound!

There are three main things to watch for in the protection of electrical equipment: (1) corrosion, (2) deterioration of insulation, (3) mechanical damage.

In the case of corrosion it is necessary to protect against moisture and corrosive fumes as might be found in chemical industries and industrial town centres. The remedy for bare metals is to use an anti-corrosive compound which can be painted on, and easily removed when required, as is required in the case of bearing surfaces.

Deterioration of insulation or of its effectiveness can again be caused by corrosive fumes, but perhaps more often it is caused by water, either by direct contact (due to a leaky roof) or by the hygroscopic properties of certain tapes and the like. The ingress of moisture is often prevented by the installation of small heater units in equipment which is likely to stand idle for long periods.

Mechanical damage seems a most obvious thing to guard against, and yet it is sometimes overlooked. Certain electrical machinery is sold as 'mouseproof.' This possibility of damage is by no means a slight matter. Mice have been known to make their nests in stationary equipment and also to damage the insulation. A fine wire mesh over openings will obviate this danger. Mechanical protection will safeguard the equipment against the more usual mechanical damage.

Above all, weather protection and regular inspection of stationary machinery and spare parts is as essential as it is with machinery in constant service. A monthly or even quarterly inspection of such equipment, including insulation tests, is a good investment.—*A. C.*

"Tempus Fugit"

AN electricity consumer complained that an a.c. mains operated time switch, controlling a coal-fired heating system, had gone haywire and thereby completely upset the "works." It appeared that this time switch had been checked about 5.00 p.m. the previous day and at approximately 9.00 a.m. the following day the clock had registered 3.00 p.m., a gain of six hours in a period of 16 hours, making the clock approx. 37·5% fast. As the clock motor was assumed to be of the synchronous type and mains frequency controlled, the idea of its gaining to this extent was rejected. The motor was partially dismantled but nothing was discovered to account for the complaint. After reassembling and testing, the clock was returned to the consumer as being O.K. Knowing this particular consumer to be a person who never made a complaint without some justification, it was decided to try and get to the root of the trouble. A thorough examination disclosed that the clock was of the self-starting shaded-pole type which automatically pulled into synchronism by means of a partially floating permanent magnet. When this magnet was removed the motor increased its speed above that of synchronism. When the magnet was locked in certain positions the effects were the same—an increase in speed.

The permanent magnet being free to move in a small arc was further restrained by small end stops made of some leather-like substance. It was noticed that one of these end stops was definitely "burred" and from this it was assumed that the magnet had slightly over-ridden this stop and in doing so had become fixed and therefore no longer free to move within its small arc. Under these conditions the motor was no longer acting as a synchronous machine but as a shaded-pole motor with the results previously mentioned. Information received from the time switch manufacturers confirmed that under certain conditions these effects could be as stated above.—*E. A. Robbins.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Problems of a practical nature to which a solution is required will also be considered. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

B.S.I. drafts new Limits Code

LIMITS and fits are of fundamental importance to engineering in all its branches, and there has been a British Standard dealing with the subject ever since 1906. This has been revised from time to time, in the light of requirements, but the last major change in the tables was in 1924. It has been felt in recent years that this standard was not altogether adequate for modern engineering practice, and so work was begun on a new edition.

A new factor entered the situation with the conference of Service representatives of the U.K., U.S.A. and Canada which took place at Ottawa in November, 1951, when the desirability of a universal inch system of limits and fits was emphasised. After due consideration it was decided that the International Standards Association tolerance system should form the basis of the new B.S., this system having been widely used in all Continental countries.

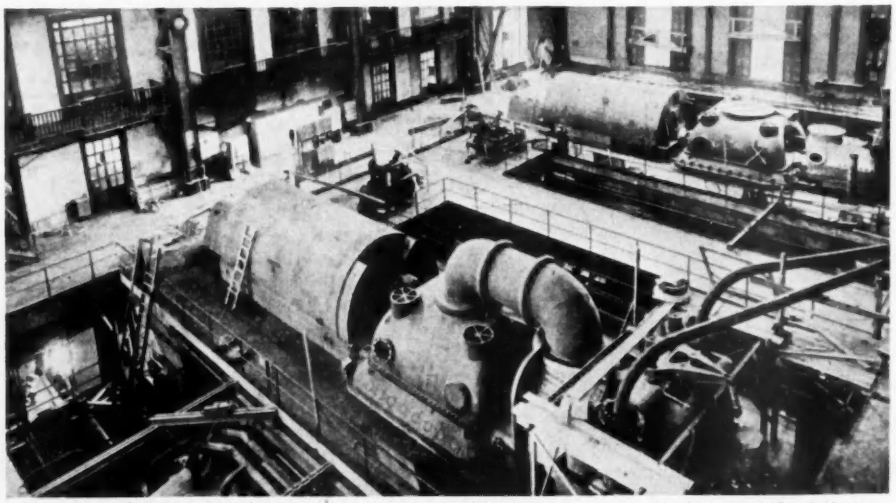
The system comprises suitable combinations of 16 qualities of tolerance (i.e., grades of accuracy of manufacture) and 21 grades of fit for both hole and shaft, ranging from extreme interference to extreme clearance. In issuing the proposed standard for comment the responsible committee is emphasising that the apparent complexity of the system is due to its comprehensive nature. Once a selection has been made of fits for the requirements of any organisation, application of the system is extremely simple.

Copies of the draft standard may be obtained from the B.S.I., 24 Victoria Street, S.W.1.

Power Plant at Genoa

TWO 60,000 kW turbo-generators, which were inaugurated at the Genoa Concentor Power Plant, Italy, on February 23 last, are the first step towards adding 1,000,000 kW to Italy's steam-driven power generating capacity. More than 50 American firms have contributed $13 million worth of ECA-financed equipment and also technical assistance to this first power project. The programme will affect nine major thermal power stations in all and total cost is estimated at approx. $100 million, to which amount the MSA will contribute two-thirds.

The Concentor plant was built in 1927 on land reclaimed from the sea. Provision was made for additional units, but these were not added until 25 years later when a $18 million expansion plan was completed. The new modern equipment, delivered from the United States, was installed by the Societa Edison, Italy's biggest electricity company.



More than a thousand workers and American-trained Italian engineers worked three shifts daily to install these two Westinghouse turbo-generators at the Concentor Power Plant at Genoa. The unit on the left was put into operation on February 23, 1952, while the one on the right will be ready in May

INSTITUTE OF FUEL LUNCHEON

Sir John Hacking Defends Electric Heating

PRINCIPAL speaker at the Annual Luncheon of the Institute of Fuel was Sir John Hacking, who replied to the toast of "The Guests," which was proposed by Dr. G. E. Foxwell. Sir John suggested that he had been invited in order to pass some remarks on electricity and fuel. He welcomed this in view of the misleading statements which had been made about the domestic use of electricity. It might be thought from reading the newspapers that the wholesale scrapping of electric fires, cookers and water-heaters would provide a panacea for the fuel problem. In fact, a broader and more balanced approach was needed. The primary difficulty was the inadequate supplies of coal being produced to satisfy all requirements for energy. Three remedies were available. First to produce more coal, second to utilise other energy sources and third to use energy more efficiently.

Any good policy would attack these three problems simultaneously. The first remedy was the responsibility of the National Coal Board. They should have produced an overall plan for production more related to requirements. An increase of 1% per year was not sufficient. On the second point, utilisation of other energy sources, the B.E.A. was making an effort to exploit to the full the hydro power available, but were opposed at every turn on the grounds of amenities. A fine tidal power site was the River Severn. This scheme would not save a kilowatt of plant, but if it had been built twenty years ago would have been of immeasurable value. The general trend toward devaluation—implying an increasing price for goods—made the scheme potentially economic. The B.E.A. was investigating the possibility of getting a detailed plan ready, so that in the event of slump or when labour and materials became available, work could begin at once.

Work on windpower was in hand, but he shuddered to think of the reaction of the amenities people. There was also the possibility of atomic energy. A set of major dimensions would probably be running on atomic energy in the next seven years, but general use was a long way off.

Using Fuel Efficiently

It was incumbent on everyone to use fuel efficiently. Fifty per cent. of the coal raised was used by the gas, coke and electricity industries. As far as electricity was concerned, the efficiency had risen from 19·8% in 1948-49 to 22% now. Within the next ten years it should be up to 26%. Referring to back-pressure generation, he said that process heat sets could be installed by works, and the B.E.A. was prepared to accept parallel running. He warned manufacturers, however, that they would have to pay for stand-by supplies.

If process heat was wanted by a group of factories, the B.E.A. would consider the installation of pass-off sets in a nearby power station. They would, however, require a statement of steam requirements. District heating schemes had failed in this country because of the formidable capital costs.

Coal formed a major item of expenditure in the gas and electricity industries and every endeavour, therefore, was made by these industries to push up the efficiency. In smaller works, however, coal formed only a small item in the costs and there was thus no incentive towards higher utilisation efficiency. The Institute could do much to help in this field.

Domestic Fuels

It had been estimated that in this country there were 2,000,000 efficient solid-fuel heating appliances and 11,000,000 old-fashioned grates. There was considerable room for economy here. The coal consumption due to electric domestic space heating was about 3½ million tons/annum. If the efficiency were doubled the saving would only be about 1¾ million tons—nothing compared with the possible industrial savings. Comparing gas and electricity Sir John said that with a thermal efficiency of 19% at consumers' terminals, there was little to chose between them for heating. The efficiency of carbonisation was about 47%. Taking into account incidental losses, this fell to 39% and with an efficiency of utilisation of about 50% the overall efficiency was about 19½%. Specially designed grates on the other hand could run at 40-50%, and for continuous heating could not be beaten. Electricity and gas on the other hand were most economic for "topping-up," as well as being clean and labour-saving.

He complained that the N.C.B. price structure penalised the power industry as the quality of coal used by power stations was so bad that the preparation, burning and ash handling involved considerable expense. It had been suggested that the domestic consumer did not pay a fair price for his electricity. The new block tariffs fully rectified this situation.

overseas news

Burdekin Scheme

For the completed irrigation, hydro-electric and flood mitigation project on the Burdekin River, the revised cost is now estimated at £70 million, according to the report of the Burdekin River Authority tabled in the Queensland Parliament last month. The report states that the preliminary estimate in 1949 for a scheme based on a storage dam 138 ft high was £29 million. The revised estimate is for the more extensive irrigation development and greater generating capacity made possible by the 150 ft dam plan, and to allow for increases in costs up to June 30, 1951. The report claims that water drainage and other revenue would more than cover all operation, maintenance and administration costs on irrigation work. And from the commissioning of the hydro-electric station, the value of power generated each year would be greater than the annual interest and redemption charges on those works. The amount of Commonwealth and state subsidy granted will determine the extent to which tariffs for power and water can be reduced. The Authority recommends that the Queensland Government, while continuing to press for Commonwealth assistance with the project, should proceed to implement it on the stage development basis outlined, to provide essential water and power supplies by 1957, and that its ultimate capacity should continue in accordance with the demand for power, etc.

Brisbane Railways

In the course of a recent résumé of the progress made on the Brisbane Suburban railways electrification scheme, Mr. J. E. Duggan, Minister for Transport, explained that much preparatory work was about to be done, and £275,000 had been allocated for the current financial year for electrification and quadruplication works in the metropolitan area. If the present plans materialise tenders will be called by the end of March 1953, for rolling stock equipment, supply and erection of overhead wiring, substation and control station plant, and signalling and communication equipment. It was expected that the closing date for tenders would be the end of January, 1954, to permit completion of the work by January, 1957. But he warned that if the present restrictions on loan money to Queensland continued it would materially affect the project date.

River Crossings

The Quebec Hydro undertaking is planning the construction of two new transmission lines, one crossing the Ottawa River and the other the St. Lawrence. The lines are part of a project to supplement the present supply of power from the Beauharnois development to the City of Montreal.

St. Lawrence Seaway

A Bill providing for joint American-Canadian co-operation in construction of the St. Lawrence Seaway project, only just got through the U.S. Senate Foreign Relations Committee last week. Then the voting ended in a draw, so the Bill was passed to the Senate without any recommendation either way. Earlier there had been a conference in Washington between President Truman and Mr. Pearson, the Canadian Secretary for External Affairs, and various officials concerned with the scheme. After that conference it was stated that the Governments of the U.S. and Canada would shortly submit to the International Joint Commission an application for permission to change the water level of the St. Lawrence in connection with the projected waterway and ancillary power developments. The commission is expected to grant the permission sought. In a subsequent statement Mr. Pearson reiterated that if the application succeeded, it was Canada's intention, in default of American co-operation, to proceed on her own account with the construction of the project.

Ontario Acquisition

The Hydro Electric Power Commission of Ontario is shortly to absorb the Ontario assets of the Gatineau Power Co., the last major private power company in the province, Mr. Challies, vice-chairman of the Commission, has announced. Although agreement has been reached as to the price, he would not disclose the figure. The Gatineau Power Co. operate a number of hydro-electric stations, but these are mainly located in Quebec and New Brunswick, and these, of course, are not affected. The company has for long provided a bulk supply to the Commission from the Paugan and Chelsea power stations on the Gatineau River. The Commission will now erect transmission lines to connect up with the Carillon plant. The acquisition is not likely to seriously affect the operations of the power company, for the assets taken over supplies less than 5,000 consumers, whereas at the end of 1951 the company and its subsidiary served a total of 71,000 consumers, it is shown in the annual report, just published.

Relief From Tax

The reduction in the Canadian excise tax on a number of electrical appliances (reported April 17, page 740) has been welcomed by Canadian dealers, who are, however, still disappointed that more relief was not obtained. (The 15% Excise Tax on stores, washing machines and refrigerators is eliminated.) The Canadian Electrical Association considers that revision of the excise taxes is "only half a loaf and the wrong half at that," "removal of the credit restrictions would have enabled many people to buy things they need but for which they can't scrape together the heavy

down payment or carry heavy payments over a short credit term," they state. But, judging from reports, the manufacturers and dealers are more optimistic as to future business. In the words of Mr. H. M. Turner, president of Canadian G.E., "the reduction in tax is not thought big enough to cause consumers to flock to buy, but it is expected to bring into stores a lot of customers who have been holding back hoping for a real price decrease." The reason for the firms' concern is shown in the record of monthly sales by manufacturers. These show that for the latest month for which figures are available, 6,407 household refrigerators were sold compared with 32,078 in the same period a year ago, 5,036 electric ranges (as against 14,895), and 11,541 domestic washing machines (compared with 25,220).

Winnipeg Rejects Proposal

Winnipeg electors at the referendum last month rejected the proposal that the provincial government should take over the City Hydro undertaking and the privately-owned Winnipeg Electric Co. Some 35,404 persons voted against joining plan "C" of the Hogg report, compared with 18,932 in favour. But only about one third of the city's eligible voters cast their votes. By this result, the Winnipeg electors have rejected the proposal that the Manitoba Hydro Electric Board should take over all generating plants; forbidden the sale of the City Hydro's power plants and nullified the deal to purchase the Winnipeg Electric Co.

New Swiss Scheme

A group representing Swiss banks and hydro-electric companies is planning to build a hydro-electric power station in the canton of Wallis. The project includes the construction of a dam across the river Lienne at a cost of some 100 million Swiss francs. The plant will be equipped with two turbo-alternators of 60,000 and 35,000 h.p., and an annual output of about 200 million kWh is expected, according to reports.

Power Cuts

The Czechoslovak government has ordered a nation-wide reduction in the use of electric power, it is reported. It is believed that the order has been made necessary by the coal industry's failure to reach its production quotas.

Plant for Dacca

The Government of East Pakistan is to build additional power plant with a capacity of 7,200 kW, at a cost of 65 million rupees. Announcing this, an official spokesman said that a new company, the Dacca Electricity Development Co., had been floated with a capital of 10 million rupees to supply the rising needs of the city. The Government is to subscribe 51% of the share capital of this company. This project is additional to the Karnafulli hydro-electric scheme.

Programme of Expansion

In its programme of capital works for which borrowing powers of over £665,000 are being sought, the East London Municipality, Cape Province, proposes expenditure of £180,000 on its electricity undertaking. Of this sum £40,000 is required for general alterations, additions and extensions, and over £100,000 for extensions to various suburbs of the city. One of the latter extensions will necessitate expenditure of £44,000, and another £24,000.

Mica Production in Brazil

A proposal that the United States Government should finance exploration for new deposits of mica in Brazil has been placed before the U.S. National Production Authority. It would also include financing of machinery to raise production from the present Brazilian deposits. The proposal was recommended by members of the Mica Importers' Industry Advisory Committee at a meeting held with the Production Authority. Without this financing, the Advisory Committee contended, Brazil would not be able to increase her mica output substantially. The Committee favoured direct Government financing rather than have the U.S. offer Brazil increased prices for mica. Government officials at the meeting outlined a three-year programme to purchase foreign "stained and better block" mica for the American stockpile. A part of the mica thus purchased would be added to the national stockpile and the remainder resold to domestic industry. The importers were told the programme did not propose establishing subsidy prices for foreign mica. Mica of a grading lower than good stained and better, such as "stained and heavy stained," would be bought at slightly below the prevailing market price. The U.S., it was revealed, was currently negotiating to establish standard contract provisions and prices for Brazilian mica. It was agreed at the meeting that U.S. standards for mica would be maintained.

Another Geothermal Scheme

Encouraged by the success of New Zealand's first geothermal power plant—at the Spa Hotel at Taupo—a timber-milling firm located near by is putting down a 6-in. bore to a depth of 1,000 ft. Two 100-h.p. steam engines to drive the mill machinery and generate power are already on the site. The Spa Hotel plant has been shut down because of the unsuitability of the engine used for driving the generator. The hotel proprietor utilised a 65-year-old single-cylinder steam engine, which rattled along harder than it ever had before! But it used less than a quarter of the output from the bore, and consequently the excess had to be blown quite frequently. This plant operated on a bore 220 ft deep, from which steam 80% dry, at 60 lb/sq in., was obtained. The saw-milling concern plan to use a large single-cylinder l.p. engine to drive the saws, and a h.p. compound engine to generate electricity.

PERSONALITIES

IN THE INDUSTRY

To succeed Mr. Brearley, whose retirement from Loughborough College we referred to last week, **Dr. H. Buckingham,** Ph.D., M.Sc.(Eng.), A.M.I.E.E., has been appointed head of the Department of Electrical Engineering at Loughborough College. Since 1946 he has held a similar position at Bradford Technical College. Educated at Northampton Grammar School, and University College, Nottingham, Dr. Buckingham was a junior lecturer and demonstrator in electrical engineering at Nottingham University, and served a student apprenticeship with the English Electric Co., Ltd., with which he later served as a switchgear engineer. In 1937 he was appointed lecturer in electrical engineering at Battersea Polytechnic, and in 1945 became head of the Electrical Engineering Department at Barnsley Mining and Technical College, leaving that post the following year to go to Bradford. Dr. Buckingham is author of a textbook on the principles of electronics. He takes up his new duties today, May 1.

Dr. H. Buckingham

Due to arrive in this country to-morrow are **Dr. J. T. Hattingh,** D.Sc., chairman of the Electricity Supply commission of South Africa, and **Mr. G. R. D. Harding,** general manager of the Commission. Their business trip will include a short visit to America, we understand.

The British Silver Medal of the Royal Aeronautical Society has been awarded to **Dr. D. M. Smith,** M.I.Mech.E., F.R.S., chief engineer, Gas Turbine Department of Metropolitan-Vickers Electrical Co., Ltd., for "his outstanding contributions in the development of British gas turbines."

Many of our older readers will be glad to have news of **Mr. C. M. Mayson,** M.I.E.E., who retired at the end of 1936 from the position of deputy chief, and stations engineer, to the Charing Cross Electricity Supply Co., Ltd. Now living at Swanage, and in excellent health, he celebrates his 80th birthday next Monday (May 5), and his golden wedding on June 10. His many friends will join in wishing him continued happiness in his retirement. Mr. Mayson is another of those cherished links with the "old days"—he was resident engineer to the Whitehaven Corporation Electricity Department, before joining the Charing Cross Co. in 1899. He showed considerable enthusiasm for diesel engined generators, it may be recalled, and introduced these on a big scale to deal with the theatre supplies which was one of the features of the Charing Cross Co. He was also president of the Diesel Engine User's Association in 1932.

Mr. Neil D. Margerison has been nominated regional manager of the Manchester branch of Philips Electrical Ltd. He joined that concern in May, 1949, as commercial assistant within the Light Group and was responsible for the sales of the "Philishave" electric razor when this was introduced to the British market. He subsequently became commercial manager of the Electrical Appliances Group, and represented the company on the Domestic Appliances Section of B.E.A.M.A. His new territory is well familiar to him, for he was educated at Queen Elizabeth's Grammar School, Blackburn, and later at the Arts Faculty of Manchester University.

Mr. N. D. Margerison

The Minister of Fuel and Power has re-appointed **Alderman E. Simms** and **Mr. W. J. Oswald,** A.M.I.E.E., as part-time members of the South Eastern Electricity Board; and **Alderman J. H. Bingham,** J.P., and **Mr. H. F. Sherborne,** M.C., M.A., Comp.I.E.E., Comp.I.Mech.E., in a similar capacity to the Yorkshire Electricity Board.

To succeed Mr. H. F. Bibby, the Metropolitan-Vickers Electrical Export Co. has appointed **J. H. Wiersum,** e.i., A.M.I.E.E., as manager of their office at The Hague, Holland. Mr. Wiersum graduated in electrical engineering at Delft University and joined M.-V. in 1938 as a special trainee. On completion of the course he was appointed to the staff of the motor engineering department where he remained till April, 1942, when he took a commission in the Royal Netherlands Navy, working on the testing and installation of radar units on British warships, having been seconded to the A.S.E. at Whitley for that purpose. He joined the M.-V. Export Co. in London in November, 1945, since when he has been directly concerned with the company's trade with the Netherlands.

J. H. Wiersum

The South Eastern Electricity Board has now amalgamated its former districts of Gillingham and Rochester, in the formation of a district to be known as Medway. In charge of this new district is **Mr. C. Cameron-Kirby,** M.Inst.C.E., M.I.E.E., M.I.Mech.E., who, in addition, continues to be Kent sub-area manager. The Board has also combined the districts of Sheerness and Sittingbourne under the managership of **Mr. F. E. Fairbank,** Assoc.I.E.E., who had formerly been responsible for the Sittingbourne and Faversham areas. These amalgamations have been made following the retirement at the end of March of **Mr. H. Hall,** A.M.I.E.E., formerly manager of the Gillingham district, and **Mr. E. Edger** from a similar position at Sheerness.

Sir George Gater, G.C.M.G., K.C.B., D.S.O., J.P., has been appointed a part-time member of the London Electricity Board.

Mr. G. D. Kaines, M.C., who joined Philips Electrical in January, 1950, as sales manager of the Electrical Appliances Group, has now been appointed head of that department.

Mr. Harold Hobson, B.Sc.(Eng.), M.Inst.C.E., M.I.E.E., has been appointed a director of Calcutta Tramways Co., Ltd.

Owing to the increased demands on his time as chairman and head of the Anglo-French Mitchell Coutts group of companies, **Mr. Leonard Aldridge** has resigned from the board of Johnson and Phillips, Ltd.

Mr. E. Kermeth, for some time manager of the Simplex Electric Co.'s Broadwell works and foundry at Oldbury, Birmingham, has left the company to take up a similar appointment with Metters, the Australian electrical equipment manufacturing concern. Our accompanying photograph, taken at a farewell gathering to mark his departure, shows Mr. Kermeth receiving good wishes from **Mr. A. C. Gardiner** who is his successor as works manager at Simplex (Broadwell), Oldbury. Also seen between the two is **Mr. P. H. Lowe,** the works personnel and welfare manager.

Mr. Kermeth, left, receiving good wishes from Mr. Gardiner

The honour of being the first engineer to spend 50 years in the Wireless Industry goes to **Mr. R. D. Bangay,** now foreign manager of Marconi's Wireless Telegraph Co. Ltd., who celebrates his jubilee on May 15 next. Born at Lyme Regis in 1883, he joined the Marconi Company, and after studying at the Marconi College at Frinton-on-Sea, went to America for the company in 1902, and during the next five years helped to install many stations, including the first U.S. Coastal Station at Babylon. Returning to England in 1907, he began his study of wireless for military purposes, and later achieved the distinction of writing the first wireless text-book, "The Elementary Principles of Wireless Telegraphy," and was later to follow up with "The Oscillation Valve." The experiments and developments he made in the military field led to the establishment, in the Marconi Co., of a Field Station Department, and he took it over, as chief, in 1914. Seven years later he became chief of designs, and in 1925, technical representative abroad, which was followed by his appointment in 1935 to his present position. In that post he has travelled abroad widely on behalf of the company.

Mr. R. D. Bangay

Mr. C. W. Glanister has been appointed Brush Aboe resident representative in British West Africa, and left to take up his post last Tuesday. He was previously Brush export London manager

Mr. H. W. Bosworth, A.M.I.E.E., chairman of Lancashire Dynamo Holdings Ltd., and Lancashire Dynamo and Crypto (Mfg.) Ltd., has recently returned from a six-months business tour of Australia, New Zealand and Ceylon.

To mark the completion of 50 years' service with the Electric Construction Co., Ltd., **Mr. J. C. Perry,** of the armature shop test at the Bushbury works, was recently presented with Savings Certificates by **Mr. W. M. B. Furniss,** assistant managing director, on behalf of the company.

To achieve closer contact with clients in the West Country, Keith Blackman, Ltd., are transferring **Mr. J. G. Eminton,** formerly of the London office, to Bristol. His address is 13 West Dene, Westbury-on-Trym, Bristol.

OBITUARY

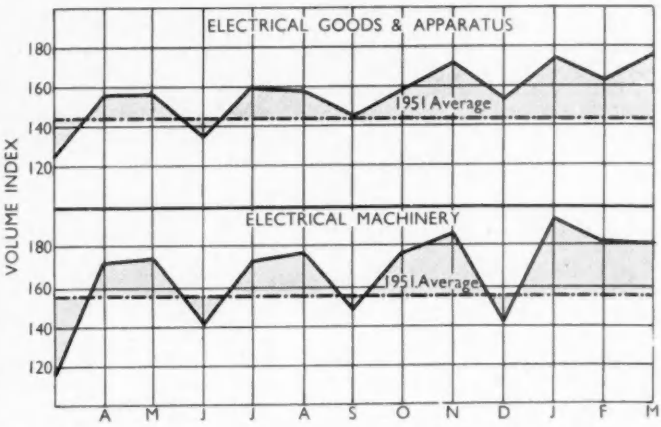
Mr. Brian H. Middleton, B.Sc.(Eng.), Grad. I.E.E., assistant engineer-in-charge at Littlebrook power station, South Eastern Division of the B.E.A., died on April 24, after being injured in an explosion at the power station on that day.

EXPORTS AND IMPORTS

EXPORT VOLUME INDEX

Record levels were well maintained during March, the achievement of manufacturers in the electrical goods and apparatus field being specially noteworthy. The remarkable January level of 171% of the 1947 average, based on corrected prices, was pushed up to 174%, the actual value of the exports in this section being £10,368,401.

In the electrical machinery category, last month's excellent performance was maintained, and the total value of exports recorded was £4,970,274, which gives an "Electrical Times" export index of 206 when related to 1947 figures and adjusted for the higher prices now prevailing.



ELECTRICAL exports last month marked up another new record—the total value of goods shipped abroad, at £16,073,011 being £44,807 higher than the previous best—that for last January. Compared with that month a number of items recorded further increases, notably radio apparatus, stationary batteries, instruments and electric cooking and heating appliances. It is noteworthy that the exports of the latter goods are being well maintained—in last month's total irons alone amounted to £81,836—but the effect of recent import restrictions may be reflected in the April figures. In addition to the items listed in the table below, the value of complete electric washing machines exported last month was £761,042, and of portable electric tools £140,549.

Description	Exports Value Month of March			Imports Value Month of March		
	1950	1951	1952	1950	1951	1952
	£	£	£	£	£	£
Telegraph and Telephone Wires and Cables—						
Submarine	90,576	11,567	233,358	—	—	—
Other	862,984	323,717	708,259	—	—	—
Rubber Insulated	313,559	305,204	787,759	—	—	—
Insulated, other than Rubber	901,771	792,139	1,193,151	—	—	—
Wireless Apparatus, including Valves	1,460,141	1,632,013	2,264,984	235,725	246,121	306,564
Telephone and Telegraph Apparatus	1,559,928	928,834	1,493,686	—	—	—
Electric Lighting Appliances, Accessories, Fittings and Parts:—						
Filament lamp bulbs	97,937	88,855	145,652	25,903	11,420	7,372
Other Descriptions	323,083	243,821	484,797	12,242	28,570	37,515
Batteries (primary)	94,935	157,506	243,392	—	—	—
Accumulators, Portable	245,423	332,870	397,259	—	—	—
" Stationary	69,228	49,406	104,986	—	—	—
" Parts and Accessories	45,780	34,872	98,199	—	—	—
Electrical Cooking and Heating Appliances	254,331	323,610	560,801	—	—	—
Ammeters, Voltmeters, etc., and Parts	107,018	93,532	164,369			
House Service Meters	103,548	54,326	142,826	28,760	33,293	97,564
All Other Instruments	107,422	148,589	120,467			
Electro-Medical Apparatus	38,471	67,361	50,953	—	—	—
X-Ray Apparatus, etc.	94,712	111,161	133,445	18,469	28,817	31,910
Insulating Materials	172,508	174,594	264,352	—	—	—
All Other Articles	445,135	469,989	766,706	152,707	76,868	231,078
TOTAL OF GROUP	7,384,490	6,343,966	10,368,401	473,806	415,099	712,003
Electrical Machinery:—						
Generating Sets (Diesel)* Not exceeding 200kW	682,675	256,611	556,303			
" " " Exceeding 200 kW	117,633	229,363	169,648	46,079	45,811	28,297
Other Generating Sets	283,392	198,548	178,039			
Generators minus Prime Movers, and Parts†	166,648	399,458	385,314			
Motors	696,775	579,726	1,101,894	62,558	32,609	52,094
Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery	2,040,761	1,269,010	2,579,076	22,095	11,563	20,297
Fans, Electrically and Power Driven	115,167	149,100	191,603	—	—	—
Vacuum Cleaners or Electrically Operated Appliances	294,143	421,589	542,733	—	—	—
TOTAL APPLIANCES AND MACHINERY	11,781,684	9,847,371	16,073,011	604,538	505,082	812,691

* 1950 figures include generators minus prime movers. † 1950 figures for parts of generators only.

The BUYER'S *Column*

Germ Killing Diffuser

ANOTHER new introduction by FALK STADELMANN & CO., LTD., 91 Farringdon Road, London E.C.1, is the electric d.d.t. and germicide diffuser which is to be seen amongst exhibits at the B.I.F.

This unit, catalogue No. U.95661, which is intended for standard voltage range 200/250 V a.c./d.c., comprises an anodised aluminium bowl supported by a black plastic bracket. In the bowl is a 25 W element which slowly heats the germicidal cartridge causing it to emit a vapour lethal to all insect pests and to the majority of germs. Convection currents carry this vapour about the room. Heating is controlled by thermostat incorporating a radio and t.v. interference suppressor.

Weighing 1 lb. 2 oz. and approximately 1 ft. long by 4 in. square, the diffuser will deal with 5,000 c.ft of air. It should be mounted away from draughts at a height of 7 ft above floor level.

Apart from D.D.T. cartridges, the equipment will heat and diffuse germicide cartridges for cleansing the air and chlorophyll cartridges for the removal of smoke and unpleasant odours.

Price complete is £6 6s., whilst replacement cartridges are priced one guinea per pack of six.

Isomantles for Dangerous Areas

ISOPAD, LTD., 13-17 Rosemont Road, London N.W.3, have for some time now specialised in the development of unusual methods of heating for industry and research.

Latest development is a range of electric heating mantles suitable for use in "flameproof areas." They are also of special value where it is essential that spillage proof robustly constructed heating mantles are required.

These "F.P.M." type Isomantles comprise stove enamelled spinnings, mounted on mild steel supports, in which the heating element of metal-clad mineral insulated pattern is attached to a high-temperature resistant glass cloth shaped to the contours of the vessel or flask to be heated. This heating circuit terminates in flameproof glands screwed into flameproof terminal boxes which take ¾-in. conduit.

Two types of metal-clad elements are available. Isomantle FPM/C with copper-clad elements, which should be used for element temperatures below 250° C. mainly for low temperature distillations, reflux and other processes. Type FPM/S has stainless steel-clad elements for element temperatures up to 600° C.

For covering the top of the flash or vessel to compensate for heat losses, Isomantles type FTP are supplied. These have a glass cloth cover, can be opened on one side, and can be slipped over the upper half of the vessel without disturbing the assembly.

Price Changes

AS from April 22, the prices of Models ST 100U and ST 120A from the range of STELLA RADIO AND TELEVISION CO., LTD., 9-15 Oxford Street, London W.1, were reduced as follows:

Model ST 100U, from £14 14s. 2d. p. tax £6 5s. 10d. to £11 15s. 4d. p. tax £5 0s. 8d. Model ST 120A, from £18 15s. p. tax £8 0s. 6d. to £14 6s. 9d. p. tax £6 2s. 9d.

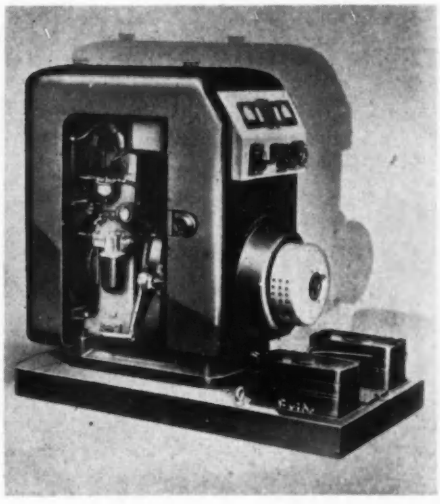
However, an increase in price is announced by PHILIPS ELECTRICAL, LTD., Century House, Shaftesbury Avenue, London W.C.2. With effect from May 1, the price of the "Philishave" electric dry shaver will be increased from six guineas (tax paid) to £6 19s. 6d. (tax paid).

New Range of A.C. Generator Sets

A new range of self-contained 3½ kVA generating sets designed primarily for the export market is now in production at the Coventry factory of STAR ENGINES, LTD. Built to provide a.c. supplies at 110 or 230 V, 50 or 60 cycles, single- or three-phase, these Star "Lynx" power plants can be supplied with hand, press button, fully automatic or remotely operated starting controls.

Each set consists of four main components—a single-cylinder diesel engine, a 3 kW alternator and a control box all mounted on a light alloy base.

The "Lynx" press-button starting model



A number of interesting features have been incorporated in the design. The steel-backed main bearings, for example, pre-finished and lined with white metal, can be replaced without any "fitting." This also applies to the precision steel-backed, copper-lead, indium plated big-end bearing. Similarly, a new dry-type iron cylinder liner can be fitted with equal ease. Crankcase and integral sump are cast in non-corrosive silicon-aluminium alloy.

A flexible coupling connects the engine to the ventilated, drip-proof, self-regulating type alternator, constructed to B.S.S. 168. The latter is spigoted to the machined magnesium alloy base casting and the engine located by dowels.

This basic unit, with the addition of a control cabinet, comprises the "Lynx" Mark I set.

Mark II, the press-button starting type, is mounted on a fabricated sub-frame extended to carry two 12-volt 57 Ah Exide batteries connected in series.

"Lynx" Mark III, the automatic set, is similar in appearance. The unit starts as soon as a minimum load of 60 W is switched on and continues to run until the last light or appliance is turned off. The last type, the "Lynx" Mark IV, is similar to the Mark II, but with the addition of a remote control switchbox.

Plessey's "Nyquist" Plotter

IN designing servo-systems it is usually required to find the response of the system or of its component parts to sine waves of various frequencies.

Most useful record is the Nyquist diagram, a polar plot of the locus of the vector which represents in amplitude and phase the transmission of the apparatus under test.

Normally the equipment required in the laboratory is a large array of instruments sometimes involving considerable inconvenience and expense.

The Nyquist diagram-plotter produced by PLESSEY CO., LTD., Ilford, Essex, fulfils most of the essential requirements and in addition can be operated by comparatively unskilled people for the routine testing of production servo components. Developed in connection with an M.o.S. contract, the unit enables a permanent record of the frequency response to be obtained quickly and accurately.

Provisional specification of the apparatus is as follows: Frequency range—0·16 c/s to 1600 c/s. Oscillator output: 15 V max. source impedance 500 ohms. Input impedance—250k ohms. Amplitude range —30/1 approx. Dimensions—2 units 22″×12″×12″ each.

Cable-Sealing Chambers and Glands

THE new leaflet issued by AUSTIN TAYLOR ELECTRICAL, LTD., Ellesmere Street, Failsworth, Manchester, has drawn our attention to the range of cable-sealing chambers and glands, which are specialities of that firm.

These boxes and glands used for sealing paper insulated, lead covered, and armoured cables have been designed for direct bolting on to switches, distribution boards, bus-bar chambers, etc., and are very suitable for vertical, horizontal or inverted mounting. Boxes are cast in grey iron with ground faces, and are complete with wiring gland, armour clamp and undrilled hard wood plate. The larger sizes are split on the cable centre.

For use with cambric v.i.r. trs or lead-covered and armoured cables, there is a range of brass packing type glands. On tightening the gland nut, the conducting compound washer compresses on the cable making a waterproof seal. The glands are normally supplied with lock-nut and armour clamp. For use with rubber, pvc and similar unarmoured cables, a brass gland with rubber compression washer is available.

TRADE PUBLICATIONS

RESISTANCE WIRES.—New booklet giving details and technical data about the resistance wires and tapes and molybdenum rods, wires and tapes produced by the company, have been issued by Vactite Wire Co., Ltd., 24 Queen Anne's Gate, London S.W.1.

TRANSFORMER CORES.—"C" type cores for hermetically sealed and open-type transformers and chokes is the title of an interesting publication just issued by English Electric Co., Ltd., Queens House, Kingsway, W.C.2.

ELECTRIC FENCING.—An explanatory folder describing the Wolseley system of electric fencing has been issued by the Wolseley Sheep Shearing Machine Co., Ltd., Electric Avenue, Witton, Birmingham.

The WEEK in NEWS

B.E.A. Loan Fully Subscribed

Stocks issued to date total nearly £742 million

IT was announced last week-end that applications for amounts up to and including £100,000 of the B.E.A.'s £150 million issue will receive allotments in full, while applicants for amounts above that figure will get about 90% of what they seek. Allotment letters have been sent out. Dealings started on Monday at a discount of $\frac{1}{16}$ on the issue price and closed at $\frac{3}{8}$ discount.

The £150 million of 4¼% stock was issued at £99 per cent., of which £10 per cent. was payable on application and the remainder in three stages, to be completed by July 24 next. Payment may be made in full after allotment, under discount of 3%. The proceeds of this issue will be used to repay temporary borrowing, which at March 31 last totalled £121 million, and for other purposes.

Prior to the flotation last Friday, the B.E.A. had issued stocks totalling £591,921,407, of which £341,921,407 were issued at par in four groups in accordance with the compensation values determined in respect of the extinguished securities of companies and other bodies dissolved at vesting day, and in respect of compensation payable to composite companies. Those four groups comprised £340,810,707 of 3%, 1968-73; £587,900 of 3%, 1948-53; £110,400 of 5%, 1953; and £412,400 of 5%, 1957, all of which were issued by August, 1948. These were followed in October, 1948, with the first of the issues to finance extensive capital developments—£100 million of 3%, 1974-77. In May, 1950, there was a further issue of £150 million of 3½% stock, 1976-79, of which £65 million was earmarked for the discharge of bank advances up to March 31, 1950. The balance has been used up during the past two years, and at March 31 last the B.E.A. had borrowed another £121 million. In the City circles, it is estimated that if the B.E.A. continues at that rate of expenditure, the present issue will probably have been used up by the end of July next, and that, of course, means that bank loans may then be needed.

MILLS' ELECTRICIANS HAVE RISE IN WAGES

ELECTRICIANS employed in the flour milling industry are to receive an increase in pay, with effect from April 7, under an arbitration award. The new weekly wages are 157s. 6d. in Class "A" mills, 149s. in Class "B" and 145s. in Class "C" for a 44-hour week, the grading relating to the geographical location of the mills. This increase amounts to 11s., 10s. 6d. and 10s. 2d. respectively for "A," "B" and "C" areas. The claim, for a substantial increase in pay was first put forward by the E.T.U. in December, 1951, but was then rejected by the employers.

B.E.A. TO CONSIDER RESALE OF ELECTRICITY TO SUB-TENANTS?

THE matter of charges which are being made to sub-tenants for electricity was raised at last week's meeting of the Midland Electricity Consultative Council. One member asked that consideration be given to some 60,000 such tenants in the Birmingham area who, it was alleged, were being charged as much as 1s. per unit in some cases. It was proposed that a clause be included in the Electricity Act, similar to that in the Gas Act, which provides that gas cannot be resold above a certain price.

Mr. P. W. Dickson, the Council's secretary, told the meeting that by a coincidence, the B.E.A. had informed the Board a few days earlier that it had this same matter under consideration. He also stated there could be no interference with a landlord by the Minister, the B.E.A. or Board under existing legislation.

At the same meeting it was also suggested that a separate tariff be introduced for charitable institutions, but the chairman, Ald. H. Leeson, said, although the Board was sympathetic in this matter they had no statutory powers to introduce such a tariff.

The First Half-Century

The L.C.C.'s shallow subway under the new street from Holborn to the Strand came before Mr. Hobhouse's Committee also, and was duly passed subject to protection to the District Railway at the Embankment end. It will really run from the end of Theobald's Road to the Embankment arch of Waterloo Bridge. There will clearly be no peace until someone has tried a shallow subway and this generation has had in its turn a demonstration of what cut-and-cover work means in a London Street, therefore, it is well that the Bill is going through, since the experiment can be made here with the least inconvenience and expense, as most of the route has to pass through chaos in any event owing to the construction of the new street. *From our issue of May 1, 1902.*

Mr. Skinner opposes the Fuel Policy

Three weeks' work a Year needed to supply Domestic Boiler

ADDRESSING the ninth meeting of the S.E. Electricity Board with manufacturers which took place at Brighton last week, the Board's deputy chairman, Mr. W. R. T. Skinner, said he could not let the occasion pass without a reference to the space heating and national fuel policies. The total opposition to those policies, he said, was regrettably minute, so far. A fuel policy must mean the best way of getting all available service from such fuels and sources of energy as were available, said Mr. Skinner, but even if such a policy was formulated, in the ten years or so it took to implement the scheme it would be deemed out of date.

Such a policy could not be based on thermal efficiency because there were so many different classes of coal. The amount of coal of the kind used in power stations would probably increase rapidly in future with the working of progressively poorer seams. He asked whether it might not be wise to leave the choice of appliances to consumers who would eventually determine the best and most economic method. Only by stimulating competition and avoiding the risk of making a widespread mistake by the too-easy formulation of a "policy" could the object be achieved, he said.

Mr. Skinner cited the instance of the amount of work needed in the maintenance of a solid fuel boiler. For the ordinary domestic boiler, he said, he calculated it required about 40 man-hours of labour for each ton of fuel put into it and the cinders extracted. On the other hand, the electrical method minimised labour and used the poorest qualities of fuel.

Referring to other matters, the deputy chairman said the number of consumers had been increased by 125,000 since vesting day. Rate of output of units of electricity was about 50% higher than in 1948, and just under 370 miles of new mains had been commissioned in the past year, and nearly 2,000 farms connected since vesting day.

OFFICIAL PUBLICATIONS

OVERSEAS ECONOMIC SURVEY
British West Indies
H.M.S.O. 3s.

INDUSTRIAL DISPUTES TRIBUNAL AWARD H.M.S.O. 4d.
New rates for electricians in Flour Milling Industry. (See page 825.)

D.S.I.R. ANNUAL REPORT. (See page 814.) H.M.S.O. 7s. 6d.

IMPORT LICENSING REGULATION. (Notice to Importers, No. 492). Available from B.o.T.

SOUTH AFRICAN ORDERS FOR TRANSFORMERS

WE learn that Brush ABOE (Southern Africa) Ltd. has just secured its largest order since it was formed in 1945. The contract has been placed by the Rand Undertaking of the Electricity Supply Commission of the Union, which supplies all the well-known Rand mines with power. It consists of twelve 5,000 kVA and twenty-six 1,000 kVA transformers.

Dimmer Control Lighting in New Town Hall

DENBIGH town hall has recently undergone a remarkable transformation and judging from the illustration which is reproduced on this page the new appearance is particularly pleasing. Not least among those responsible for these improvements were Thorn Electrical Industries Ltd., who have become especially well-known in recent months for their developments in stage lighting. This, incidentally, is believed to be the first installation of dimmer-controlled fluorescent auditorium lighting in N. Wales.

The new lighting installation at Denbigh Town Hall

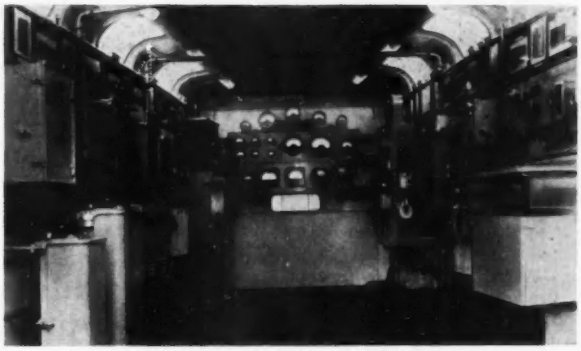
The roof was originally supported by open lattice girder and steel trusses, but these have now been enclosed behind a suspended acoustical ceiling in the form of a barrel vault. Six (FB/0081) fluorescent lighting units have been mounted beneath the balcony to illuminate the hall floor while a twin (FM/2080) fitting lights the gangway. In addition the lower boundaries of the vaulting support six close mounted (FM/2080) fittings controlled by a manual dimmer controlled from the stage switchboard.

Warm-white double-life lamps have been used throughout, and with a total loading of about 2 kW output is over 60,000 lumens. The electrical contractor was Cyril Joyce of Vale St., Denbigh.

NEW MOBILE EXHIBITION TAKES THE ROAD

THE latest firm to bring into service a travelling exhibition van is the Electrical Apparatus Co. Ltd. These mobile displays appear to be becoming increasingly popular both among the nationalised industries and private organisations as one after another takes the road. The recent addition to the fleet is to spend a time within the district of each E.A.C. branch office taking the company's products direct to premises of friends and customers.

The van has been fitted with typical items of motor control gear, a.c. and d.c. automatic and hand-operated for industrial, flameproof and marine applications. Also on view are contactor-starters, drum and cam controllers, cam pillars and panels, push-button stations and a range of instruments and meters. A demonstration unit of the firms single-phasing preventor has also been installed.



View of the interior of E.A.C.'s new exhibition van

ELECTRIC SLUICE GATES FOR THE THAMES

EXISTING chain-operated sluice gates at Caversham Weir in Berkshire are to be replaced under a £22,000 scheme which provides for electrical control. This new method of control is in the nature of an experiment, but if successful will eventually be extended to other weirs on the Thames. Plans have been completed and contracts placed, but the shortage of steel is likely to cause some delay. Work can be done only in the summer months and, we understand, may not begin until 1953. Electrical equipment is to be supplied by the Southern Electricity Board.

Caversham Weir has 16 sluice gates and is the largest in the upper reaches of the Thames. From a control room the lock-keeper will be able to operate the main switch. Then, at the gates, he will press buttons to open each gate singly.

BLAST-FURNACE SLAG FOR DAM BUILDING

THE Trief process using ground blast-furnace slag for dam construction is to be used by the North of Scotland Hydro-electric Board in the building of the Layne and Cluanie dams of the Glen Moriston hydro-electric scheme in Inverness-shire. The process was first developed by M. Victor Trief, a Belgian, and consists of reducing the slag to a wet slurry which is then passed directly into the concrete mixers to be mixed with appropriate quantities of Portland cement, aggregate and sand, to produce a concrete equal in strength to a standard mixture. The primary saving in this process is that the quantity of cement required is much reduced and this, in addition to savings in first cost, also releases a quantity of the material for export. Experiments in France have shown that the slag-cement concrete produces less heat when setting and is also more resistant to acid peaty waters than pure Portland cement concrete.

Some idea of the saving may be gained from the fact that in the two dams the actual saving in Portland cement will be about 20,000 tons. A further interesting constructional point is that the Mitchell Engineering Co. of Peterborough, the main contractors for the dams, are adopting a precast concrete slab technique for the faces of the dams. This will avoid the use of steel or timber shuttering and thus reduce the demand for these scarce materials.

E.P.E.A. SOUTHERN METER ENGINEERS

A MOST enjoyable evening was spent by the members of the Southern Meter Engineers Technical Group of the E.P.E.A. when they held their fourth Annual Dinner and Entertainment. Mr. A. E. Moore, the Chairman, proposed the Toast of "Our Guests," to which several replies were made. The principal responder was Mr. O. H. Davie, and supporting him were Mr. T. Gatley of the Northern section and Mr. O'Dea. A witty monologue by Mr. Charlie Pheby covered the enormities of meter inspectors. The final toast of the chairman was proposed by Mr. F. Lumby.

Lighting Course at Bolton

AN illumination design course is due to start at the Technical College, Manchester Rd., Bolton, this evening (Thursday) at 6.30 p.m., it was announced last week by E.L.M.A. There are to be four lectures on successive Thursdays until May 22.

Enquiries should be addressed to A. Wilcock, 27 Fearnville Grove, Roundhay, Leeds 8.

Today's lecture is on "Electric Lamp." Other talks will be on Lighting Design, Home, and Industrial Lighting.

Street Lighting Conference in September

A LARGE attendance of representatives from local authorities and electricity and gas boards throughout Britain, is anticipated at the annual conference of the Association of Public Lighting Engineers which is to be held this year at Harrogate between September 16 and 18. The overseas contingent is also likely to be a large one.

A full programme of papers dealing with various aspects of street light has been arranged. Of particular interest to delegates at this years' conference may be the paper on "Street Lighting in the U.S.A." which is to be presented by Dr. A. F. Dickerson, general manager of the lighting and rectifier department of the G.E.C. in America.

The conference will be held in the Royal Hall, and will be supplemented by two exhibitions. A marquee is to be erected in the immediate proximity of the hall to house numerous exhibits of relevant apparatus and equipment contributed by many electrical and gas firms. Also, on a site to the rear of the hall there will be displayed sundry types of steel and concrete columns, bollards and traffic signs.

200 WILL EXHIBIT MECHANICAL AIDS

THERE will be nearly 200 exhibitors at the third Mechanical Handling Exhibition which is due to open at Olympia on June 4. It is hoped to cover all types of mechanical aid in the 250,000 sq. ft. allotted to the exhibition, which is understood to be largest of its kind to be staged to date. Among exhibits will be cranes, overhead and belt conveyors, elevators, winches, power units, gears, controls and sundry accessories, there being no lack of electrical interest.

Many visitors will be arriving from abroad. The majority of European countries will be represented, as also will Canada and the U.S., and members of the Commonwealth. In addition representatives will be coming from Israel, Persia and Syria. At the Convention which is being run concurrently there are to be twelve papers presented, including that by Mr. L. Landon Goodman of the Electrical Development Association.

Kelvin Lecture on Iron Atoms

THE forty-third Kelvin lecture was delivered to the I.E.E. last week by SIR CHARLES GOODEVE, O.B.E., D.S.C., F.R.S. The subject of this year's lecture was "Iron Atoms in the Service of the Electrical Engineer." Sir Charles sketched some of the scientific aspects of iron and steel which had wide applications in electrical engineering. He mentioned the numerous attributes of the material which lent themselves to the equally numerous articles of machinery.

Following on this Sir Charles discussed the composition of iron and its chemical and physical properties. Finally the speaker dealt with the problems of creep and corrosion associated with high temperature steels.

First Television Convention

THE British contribution to Television is the title of a convention, organised by the Radio Section of the I.E.E., which is being held in London this week. The opening session, on Monday, was introduced by Lord Woolton, and at the luncheon, held on that day under the chairmanship of Sir John Hacking, Dr. D. C. Espley, O.B.E., D.ENG., chairman of the Section, welcomed the representatives, numbering over 100, of concerns from 19 overseas countries. Replying, Dr. D. B. Sinclair, S.M., SC.D., president of the Institute of Radio Engineers (America), stressed the value of the interchange of ideas resulting from the convention. Over 80 papers are being presented at the convention, which continues till May 3.

L.D. GROUP FORM NEW COMPANY

A NEW company specialising in the manufacture of switchgear has been formed by the Lancashire Dynamo organisation. This company will be known as the Lancashire Dynamo Switchgear Ltd., and production is at present under way at its Bridgwater, Somerset, factory. It will be recalled that the manufacture of heavy industrial switchgear and switchboards formerly carried out by Foster Transformers and Switchgear Ltd., another L.D. firm, at their Wimbledon works, was transferred to Bridgwater about the middle of last year.

The range of equipment to be made by the newly formed company, will comprise 25 MVA internationally test fuseswitches in capacities from 300 to 400 amps, and unit to unit heavy industrial switchboards specially designed for individual customers' requirements.

Scholarship Scheme to Compete with U.S.

ADDITIONAL details to those given in our April 3 issue concerning the F.B.I's Mission to Latin-America to extend the Overseas Scholarship Scheme, were given at a Press conference on Monday on the eve of the Mission's departure. The team consists of Sir Arthur Fleming, Mr. F. R. Livock and Mr. W. V. Jenkins. One of the principle aims of Sir Arthur and his colleagues will be to try and counter the steady flow of young engineers to the U.S. under similar schemes. To do this the team will endeavour to explain and publicise British achievements in industry. It is understood that the problem of competition in this field is largely psychological —the apparently better terms offered by the U.S. being offered to cope with the higher cost of living in that country.

It is proposed that a minimum of 30 students a year will be given, although the proportion from Latin-America will depend on the team's findings.

New Lighting in Malayan Banks

FOUR new bank lighting installations have recently been completed by the G.E.C. in Malaya. The premises concerned are the main offices of the Hong Kong and Shanghai Bank in Singapore and their branch offices in Orchard Road and Penang, and the Singapore branch of the Chartered Bank of India, Australia and China.

In the former bank's Singapore branch some 146 twin-light fluorescent fittings with reeded "Perspex" bands were used in the main hall and a further 133 fittings in the offices on the floor above. High voltage cold cathode lighting was used at the Orchard Road and Penang branches. Twin-light fluorescent units were also used in the new additions to the premises of the Chartered Bank of India, Australia and China.

NEWS IN BRIEF

Cable and Wireless Ltd.'s new cable ship *Stanley Augwin*, is due to go on her sea trials on May 7. On completing her trials she is to load cable at Greenwich and sail for Singapore to relieve the cable ship *Recorder*.

A Summer School in programme design for automatic digital computing machines will be held in the University Mathematical Laboratory at Cambridge, between September 16 and 26.

At a small ceremony recently Dr. E. W. Smith, director of Telcon, handed over the keys of the new Community Centre at Green St. Green, Orpington. The building was formerly part of the Frequency Works.

The annual report of the London Chamber of Commerce for 1951 has just been published.

A large illuminated and animated sign for Hennessey brandy has been added to the lights of Piccadilly. Over 700 lamps and 1,500 ft. of fluorescent tubing have been supplied by Philips Electrical Ltd. Installation was by London Signs and Illuminations Ltd.

MACHINERY TRADERS' 3-DAY CONVENTION

THERE was the best attendance yet at the most recent convention of the Association of Electrical Machinery Trades which took place at the Chateau Impney, Droitwich Spa, on the Sunday, Monday and Tuesday last week.

The serious business of the three days comprised two papers. Messrs. A. J. T. Timberlake and C. Horne of English Electric Co. Ltd. combined to lecture on "Design of Motors." The second paper also was the combined efforts of two authors. Messrs. J. Legate and R. Kelsall of Metropolitan-Vickers Electrical Co. Ltd. spoke on "Developments in Electronic Control of Motors."

On the social side the dinner was especially successful and the function included a cinematograph performance. The visit to the Shakespeare Memorial Theatre presented an opportunity of seeing the up-to-date stage equipment and lighting.

U.K.'s Electric Railways

AS soon as capital was available, railway electrification schemes would go ahead in various parts of the country, said Mr. J. Elliot, chairman of the Railway Executive last week. Among schemes envisaged was the extension of the Great Northern line possibly as far as Hitchin and Grantham, and plans were being laid for the Manchester, Liverpool and Glasgow areas. Crewe would also see electrification, and an increasing number of diesel operations. The London-Southend line was not likely to be completed until about 1957. Plans were also in hand for the electrification of all lines of the South-East.

B.E.A.M.A. Meeting

ADDRESSING the annual meeting of B.E.A.M.A. last week, Mr. T. F. Lister, chairman of Council, spoke of the help the electrical industry had given during the Association's 50 years' existence in lightening the toil and burden of ordinary people. It had always been the aim of the industry to be free to use freedom for the development of new ideas, and it was that precious freedom which must be maintained, he said. Referring to exports, Mr. Lister said total value of electrical exports had reached £189 millions, an increase of 20% over 1950-51.

The chairman also had a word to say on recent criticism of electrical appliances. He assured his audience that B.E.A.M.A. were considering the matter and with the B.E.A. were preparing a report. As soon as it was ready strong countering action would be taken.

British cookers appear to be finding favour with S. African housewives. In two large blocks of new luxury flats just completed in Johannesburg, 139 flats have been equipped with G.E.Co.'s D.C. 114 cookers. Our picture shows one of these cookers installed in a modern kitchen in one of the blocks

Questions in Parliament . . .

Engineering Courses

Questions were asked last Thursday concerning provisions for the training of highly skilled engineering craftsmen. Mr. Ellis Smith wanted to know whether there were courses which would equip men for the future; what changes were under consideration in any such courses; what alterations were being made to convert the City and Guilds certificates courses into a full technological educational course; and what steps were being taken to cater for modern requirements. He also asked whether it was proposed to provide a National Certificate for the highly skilled craftsmen.

Miss Florence Horsbrugh said the courses in technical colleges were continually under review and being developed. The present arrangements, she thought, were meeting the requirements of industry. A proposal for a national craft apprenticeship certificate had been considered, but rejected.

Bank Advances

Mr. G. Nabarro asked the Chancellor of the Exchequer on Thursday what control was exercised over bank advances to nationalised industries. He also queried whether further sums would be allowed above the present total of about £140 million, when the financing of those industries would be carried out, and what methods he proposed to sanction. On the Chancellor's behalf, Mr. Boyd-Carpenter said that before borrowings were approved, the Treasury had to be satisfied that the advances were necessary for approved capital programmes. Borrowings by the B.E.A., which, he said, accounted for the majority of advances at present, were funded by a public stock issue. It was not possible to forecast whether further bank advances would be necessary as regards other industries.

Bank Rate and Coal

Mr. Geoffrey Lloyd has told the House that the increase in the bank rate had had no effect on the price of coal so far. He did not anticipate a significant effect in the future.

Fuel Saving Scheme

Maj. Hicks Beach asked last week when details of the Government's proposal to make available £1 million for loans to firms to facilitate the installation of approved fuel-saving equipment were likely to be available. It was hoped to publish details of the scheme by the end of May, stated the Minister of Fuel and Power.

Lighting Zebra Crossings

The Minister of Transport was questioned last week concerning reports of the Committee on Road Safety. Among the queries was one on the proposed action if any to be taken in connection with the lighting of zebra crossings. The Minister said that technical recommendations on the subject were being studied and an announcement would be made when a decision had been reached.

Overseas Market Research

The President of the Board of Trade told the House last week at question time that the Commercial Relations and Exports Dept. of the B.o.T. was at the disposal of exporters on the matter of export market research. Broad surveys of the market for specific goods in particular countries were always available. Where special studies for particular products were required, he advised the services of a private organisation. The Minister added that full use was being made of these services at present.

Shops and Offices and the Factories Acts

Sir Walter Monckton told the House last week that he would not extend the provisions of the Factories Acts to shops, warehouses and offices. Such premises were, he said, better covered by separate legislation. Pressed on the subject with the fact that there was a good deal of power-driven machines and equipment in those premises and there were accidents which were not recorded, Sir Walter reminded his questioner that the Gower Committee carefully considered the matter and reported to other Ministries. The report was being considered but there was no suggestion of the mere application of the Factories Acts to those premises.

Steel from America

During the first quarter of this year about 172,000 long tons of steel, pig iron and scrap for Britain had been delivered at works in the U.S. or at other sources of supply, said Mr. Duncan Sandys last week. Of this 85,000 tons had reached the U.K. It was expected that deliveries at the source of supply would be completed by the end of 1952 in accordance with the agreement relating to the supply of one million tons from America, he added.

Wholesale and Capital Equipment Prices

Asked, concerning the percentage increase in wholesale prices over the average of 1947, 1948 and 1949, and the corresponding rise in the cost of capital equipment, Mr. R. A. Butler said in the final quarter of 1951 wholesale prices were 54% higher than the average of those three years. For the latest figures he referred his questioner to the Monthly Digest of Statistics for last March, Table 152. Mr. Butler said comprehensive figures of prices of capital equipment were not available, but for a selection of items of plant, machinery, vehicles, building and civil engineering work there was an increase of about 30% over the same period.

Electric Supply News . . .

Belfast

Concerned at the delays in granting permission for the carrying out of projects by the Electricity Department the Corporation General Purposes Committee is to take up the matter with the Government. At last week's meeting the Committee had before it applications from the Electricity Committee for more than £250,000 representing over-expenditure on a number of projects. The extra cost, it was stated by Sir William Neill, chairman of the General Purposes Committee, was due to the rise and fall clause in contracts and could have been avoided if Government delay had not held up the work.

Bristol

To meet the increasing industrial load in the area of Avonmouth Docks, the South Western Electricity Board is planning to augment the 33 kV network in the district at a cost of £63,000. The Board is also to take 930 yards of high-voltage mains to Backwell Hill, near Bristol, where the complete electrification of Small's Quarry is planned to increase output of limestone. This scheme will involve taking a 11 kV line from Lulsgate, to the existing plant at the quarries.

Dumfriesshire

The South West Scotland Electricity Board has approved of a scheme to reinforce the network in the north-west part of Dumfriesshire at an estimated cost of £93,200. The scheme, which it is hoped to complete in three years, provides for the erection of a second 33 kV o.h. line with a rating of 20 MVA for a distance of 15 miles from Dumfries to Penpont to supplement the existing line. In addition, a 33/11 kV substation will be constructed at Penpont where two 5 MVA transformers will be installed, and also switchgear to control the existing 33 kV line to Kirkconnel, a further 15 miles north of Penpont.

North Eastern

At the meeting of the area consultative council last week, it was stated that the North Eastern Electricity Board had been authorised to spend £500,000 in extending supplies in rural areas this year. During the year supplies would be initiated to 18,500 houses now being built, said Mr. W. S. Hall, chairman of the consultative council. In the rural area scheme, work on the supplies to nine villages, suspended last year through capital expenditure curtailment, would be resumed and work started in supplying 57 villages involving about 1,600 consumers. Negotiations on supplying a large number of isolated farms would also be reopened. They also hoped for some mains extensions to existing housing sites so that something like 2,200 houses, coming within priority categories would be connected.

Power Station Consents

The B.E.A. has now received the formal consent of the Minister of Fuel and Power to the establishment of a new section of the Hams Hall power station, near Birmingham, to be known as Hams Hall "C". The new "C" section will have an installed capacity of 360 MW, composed of six 60 MW turbo-alternators each served by a 550 klb/hr unit boiler. Three cooling towers, each of 6 million gal/hr. capacity will serve the new section. The present Hams Hall "A" and "B" power stations have an installed capacity of 249·45 MW and 321 MW respectively. Formal consent has also been received to extensions at Ocker Hill, Northampton and Hackney power stations. At Ocker Hill the extension will consist of two 30 MW turbo-generators and three 180 klb/hr. boilers. At Northampton a further 30 MW set and two 150 klb/hr. boilers will be installed, while at Hackney, a 30 MW set and one 300 klb/hr. boiler will be added.

Stockton-on-Tees

The Town Council, which recently protested that the British Electricity Authority had been given permission to erect 275 kV o.h. transmission lines in the western part of the town which might hinder development in that area, has received a letter from the B.E.A. that the Authority could not incur expenditure at present on heightening the proposed lines. The B.E.A. stated that although it would not be justified in incurring heavy expenditure at this stage in heightening the lines, in the event of the position changing, it would be prepared to discuss with the Council any steps with regard to the height of the lines which then might be appropriate.

LIGHTING SCHEMES

Boldon (Co. Durham).—U.D.C. has received consent to borrow £1,272 for electric street lighting at Boldon Colliery, West Bolden and Cleadon Lane.

Dungannon.—The U.D.C. is considering a scheme for improved street lighting, to cost £5,846.

Leeds.—T.C. has received M.o.T. sanction to install 250 Group A tungsten filament street lamps on 4½ miles of main traffic routes.

Morecambe.—T.C. applying for sanction to borrow £8,723 for street lighting improvement.

Sunbury-on-Thames.—The borough surveyor has been instructed to ascertain the cost of changing over street lighting to electricity and whether the M.o.T. would sanction such expenditure.

Wanstead and Woodford.—T.C. has approved the conversion to electricity of lighting in St. Barnabas Road and Latchett Road, at a cost of £2,692.

Company Activities . . .

British Xylonite Ltd.

For 1951, the group profit, after charging taxation of £551,900 (*£397,317*), is £358,992 (*£296,192*), of which £237,527 (*£194,381*) relates to the holding company. The final dividend is 6% plus bonus 2%, on capital increased by 150% capital bonus, making 13% for the year.

Canadian Marconi

For 1951, the profit is $323,675 ($*523,283*) after charging depreciation of $340,248 ($*261,947*) and adding $18,700 ($*25,000*) investment income. Deduct interest on overdraft and loans $113,878 ($*68,084*), provision for inventory losses $53,528 (*nil*), materials adjustment nil ($*97,346*), executives' remuneration $47,470 ($*50,015*), directors' fees $6,360 ($*5,520*), legal expenses $2,518 ($*4,544*) and Provincial taxes $12,000 ($*10,500*), leaving a net profit of $106,671 ($*312,274*).

W. Canning & Co.

Net profit for 1951 is £163,262 (*£172,301*) after charging taxation of £398,151 (*£237,074*). The final Ordinary dividend is 1/3d. per 5/- unit (*same*), making 1/9d. (*1/6d.*) for the year. The sum of £25,000 (*£100,000*) is placed to general reserve and £50,000 (*nil*) to contingencies.

Hall Telephone Accessories

Profit for 1951, after all charges including £30,658 (*£36,500*) for taxation, is £15,650 (*£26,617*). The dividend is again 10%.

Laurence Scott & Electromotors

For 1951, the net profit is £168,707, compared with £134,063 for the previous year, after charging taxation of £228,000 (*£209,000*) and providing £21,456 (*£17,504*) for pension schemes. There is recommended a dividend on the "A" and "B" Ordinary of 15% (12½%).

Mavor & Coulson

Consolidated trading profit for 1951 is £408,784 (*£380,287*). Depreciation takes £47,991 (*£40,340*), taxation £203,000 (*£183,820*), etc., leaving a net profit of £155,151 (*£153,445*). After dividends, and transferring £119,615 (*£147,214*) to general reserves, there is £73,792 (*£67,748*) carried forward.

McMichael Radio Ltd.

Net profit for 1951, including provisions no longer required is £22,186 (*£19,650*) after charging taxation of £26,700 (*£17,250*). The dividend is again 8%. To general reserve £10,000 (*same*), and there is £13,542 (*£11,051*) carried forward.

Newman Industries

For 1951, the profit on trading, etc., amounts to £189,146 (*£100,033*). Depreciation, emoluments, etc., take £97,385 (*£82,666*) and taxation £65,000 (*£9,850*), leaving a net profit of £26,761 (*£7,517*). The Ordinary dividend is raised from 6% to 10%. The sum of £102,910 (*£88,401*) is carried forward.

Pressed Steel Co.

Profit for 1951 after all charges, including taxation, and after appropriation for increased cost of replacement of plant, etc., is £925,408, a decline of £98,401 compared with the 1950 total of £1,023,809. Taxation charged amounts to £1,578,337 (*£1,645,540*), and £250,000 to replacement reserves. The final Ordinary dividend is again 12½%, making 20% as before. The sum of £550,000 (*£350,000*) is transferred to general reserve and there is £1,551,573 (*£1,307,752*) carried forward.

Southern Areas Electric Corpn., Ltd.

For 1951 the consolidated profit, after writing £35,783 off fixed assets, is £116,333 (*£34,671*). Taxation absorbs £82,166 (*£41,987*), and the net profit is £34,167 (against a loss after adjustment for outside interests, of £5,995). The holding company's profit is £28,102 (*£23,477*). The Ordinary dividend is resumed with a recommendation for 5% (the previous payment was 5½% for 1949). The sum of £111,321 (*£102,526*) is carried forward.

Sturtevant Engineering Co.

Group profit for 1951 is £578,558 (*£488,166*). Taxation absorbs £329,975 (*£271,214*), leaving a net profit of £248,583 (*£216,952*). To general reserve £186,314 (*£132,217*), reserve for office extensions nil (*£30,000*), and after dividends, including final of 12% tax free on increased capital, there is £91,268 (*£85,957*) carried forward. Current assets are listed at £2,015,122 (*£1,596,904*), and current liabilities and provisions £876,113 (*£644,521*).

West London and Provincial Electric and General Trust

Gross income for the year is £66,286 (*£55,894*). There is a final Ordinary dividend of 5% plus bonus 2% (*same*) making 10% (*9%*). The net profit is £25,226 (*£21,390*) after charging taxation of £23,468 (*17,334*). The sum of £10,000 (*£5,000*) is placed to general reserve, and £10,230 (*£10,209*) is carried forward.

Dividends Declared

Aerialite Ltd.—Interim of 33⅓% (*same*).

Brazilian Traction Light and P. Co.—Ordinary dividend of 50 cents (*Canadian*).

T. Clarke.—Final dividend of 9%, making 18% (*both same*).

Ever Ready Trust.—Final dividend 8% (*7%*), making 13% (*12%*) on capital as reorganised last June.

Ransomes and Rapier.—Final Ordinary dividend 5% tax free, making 7% tax free (*both same*).

Commercial Information

CONTRACTS OPEN

HOME

May 2.—Laoighis. Supply and installation of one direct-driven electrically propelled pump for Stradbally sewerage scheme. Nicholas O'Dwyer, Consulting Engineer, 6 Burlington Rd., Dublin. Deposit £5 5s.

May 3.—Leigh T.C. Complete installation of (*a*) 2·24 miles of Group A mercury vapour lighting on concrete columns; (*b*) 0·24 miles of Group A fluorescent lighting on concrete columns; and (*c*) 0·6 miles of Group A mercury vapour lighting on trolleybus poles. Borough Engineer and Surveyor, Town Hall.

May 3.—Manchester. Supply of electric lamps required by Central Purchasing Committee. General Manager, Corpn. Transport Dept., 55 Piccadilly, Manchester.

May 3.—Stretford T.C. Electrical installation in block of 22 flats on Moss Park (No. 2) site. A. H. Perry, Borough Surveyor, Town Hall. Deposit £2 2s. (See April 24 issue.)

May 3.—Sunderland T.C. Electrical work in 360 houses on Farringdon estate. H. C. Bishop, Borough Architect, Stockton Rd.

May 5.—Basingstoke T.C. Supply and erection of system of three 140-W sodium lamps on concrete columns along By-pass. W. G. A. Clark, Borough Surveyor, Municipal Buildings. Deposit £2 2s. (See April 24 issue.)

May 5.—East Ashford R.D.C. Installation of electric wiring for points, etc., in 30 houses on four sites. Surveyor, 8 Elwick Rd., Ashford, Kent.

May 7.—Gateshead T.C. Electrical installation in new £90,000 offices for Borough Treasurer's Dept. on Shipcote site. H. J. Cook, Chief Architect, Municipal Buildings. Deposit £2 2s.

May 7.—Newcastle-on-Tyne. Electrical installation required for 252 flats being built on Slatyford Lane estate. City Architect, 18 Cloth Market, Newcastle.

May 8.—Leeds. Electric lighting installations in adaptations at 82 Cardigan Rd. Director of Works, Sweet St., Leeds 11.

May 9.—Sheffield. Electrical installations, in 42 houses on Birley estate and 20 on Basegreen estate. W. G. Davies, City Architect, Town Hall. Deposit £1.

May 10.—Glasgow. Transport Dept. requires supplies of v.i.r. and p.v.c. cables, electrodes and electric lamps. Applications to be included on list of contractors to General Manager, Transport Dept., 46 Bath St., Glasgow, by above date.

May 12.—Cockenzie and Port Seton T.C. Electrical work in erection of 32 houses on Old Golf Course site. James Gentles and Son, Chartered Quantity Surveyors, 18 Hanover St., Edinburgh.

May 12.—N. Ireland. Housing Trust requires electrical installation in 47 dwellings at Portstewart. Trust is at 12 Hope St., Belfast. Deposit 10s.

May 12.—West Riding. Renewal of electrical installation (phase 1) at Thornton View, Clayton. County Architect, "Bishopgarth," Westfield Rd., Wakefield. Deposit £2 2s. (See April 24 issue.)

May 14.—Wandsworth B.C. Installation of new electrically operated pump and other work at Putney Depot. Documents from Borough Engineer and Surveyor, Municipal Buildings, S.W.18.

May 15.—Londonderry. Electrical installation in Limavady primary school extension. County Education Architect, Education Office, New Row, Coleraine. Deposit £1.

May 17.—Ashton-in-Makerfield U.D.C. Supply of all-steel electric driven screw baling press for making 1½ cwt. bales of waste paper. Frank Dean, Clerk of Council, Town Hall.

May 20.—N. Ireland. Electrical installation at Altagelvin House, Londonderry for N.I. Hospitals Authority. Architects are W. and M. Given, Waterside, Coleraine.

May 24.—Salford. Supply of one 22 ft tower waggon for street lighting department. Street Lighting Superintendent, Bloom St., Salford 3.

June 4.—Newmarket U.D.C. Supply and erection of (*a*) 11 concrete columns with lanterns and 400 W h.p.m.v. lamps and other equipment for Group A street lighting in Exning Rd.; and (*b*) 48 concrete columns with lanterns and 150 W tungsten lamps and auxiliary equipment for Group B lighting in Rous Rd., Vicarage Rd., Park Lane, Queen St., The Severals and Houldsworth Valley estate. F. B. Waterfall, Engineer and Surveyor, Severals House, Bury Rd.

June 6.—Belfast. Supply and erection of 33 kV and lower voltage cables for Victoria power station. Documents from Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (See April 24 issue.)

June 16.—Bristol. Supply of electrical stores for year ending June 30, 1953, for Cosham and Frenchay Hospital Management Committee. Secretary, Frenchay Hospital, Bristol.

No date stated.—Argyll. Electrical work in erection of a total of 85 houses in 15 groups on various sites, each of which will be dealt with separately. Applications immediately to County Architect, County Offices, Dunoon.

No date stated.—Barrhead T.C. Electrical work in erection of 16 flats at Bourock Sq., 15 in Kelburn St., and 10 in Fereneze Ave. Names to Wm. Baillie and Son, Architects, 4 West Regent St., Glasgow C.2.

OVERSEAS

Details of items marked may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

May 10.—Pakistan. Supply of one 60-ton electric derrick crane, for Port of Chittagong. Ministry of Communications (Railway Div.), Govt. of Pakistan, Karachi. B.o.T. (Ref. CRE 14372/52).*

May 12.—Pakistan. Supply of switchgear for Manora workshop power station and four small

electrically driven pumps for water supply. Chief Engineer, Karachi Port Trust, Karachi. B.o.T. (Ref. CRE 15318/52)*

May 14.—Australia. State Electricity Commission of Victoria invites tenders for manufacture and supply of electric motor-driven centrifugal fans for Yallourn power station B boiler house. Commission is at 23/32 William St., Melbourne. B.o.T. (Ref. CRE 14871/52).*

May 14.—India. Supply of 290 miles of underground cable lead-covered paper core quad carrier armoured (telephone). Director General of Supplies and Disposals, Shahjahan Rd., New Delhi. B.o.T. (Ref: CRE 13629/52)*.

May 15.—Uruguay. Supply of 1,000 lamps, 130 V, 6 W, intermediate screw-thread between Mignon and lantern for indicators on lifts. Tenders to Secreterie de la Direcion General de la A. N. P., 3 Piso, Rambla Franklin D. Roosevelt, entre Maeral y Guarani, Montevideo.

May 17.—Greece. Supply of 5,500 metres of underground 100-pair telephone cable for Ministry of Communications, Athens. B.o.T. (Ref. CRE 14209/52).*

May 20.—Australia. Supply and installation of 240 kW generating set required at Central Telephone Exchange, Brisbane. Engine should be of solid injection diesel type operating at no more than 750 r.p.m. and driving direct-coupled alternator which in turn should be capable of generating 240 kW at 415/240 V, 3-phase, 50 c/s, a.c. Dept. of Works and Housing, Terrica House, Greek St., Brisbane. B.o.T. (Ref. CRE 14342/52).*

May 21.—Uruguay. Administracion Nacional de Combustibles Alcohol y Portland invites tenders for supply of lifting tackle to various specifications. B.o.T. (Ref. CRE 14119/52).*

May 22.—India. Supply of a total of some 1,332 miles of paper-insulated lead sheathed dry core steel tape armoured-type underground telephone cable to various specifications. Director General of Supplies and Disposals, Shahjahan Rd., New Delhi. B.o.T. (Ref: CRE 13586/52)*.

June 3.—Portuguese W. Africa. Supply and installation of eight electric automatic traffic lights for 220 V a.c. 50 c/s supply, for Municipality of Luanda. B.o.T. (Ref. CRE 14114/52).*

June 11.—Australia. Manufacture, supply, maintenance, etc., of two 1,500 MVA step-down transformers for use on 66 kV 3-phase 50-c/s system at Theodore substation, for State Electricity Commission of Queensland. B.o.T. (Ref. CRE 13277/52).*

CONTRACTS PLACED

Dukinfield T.C. Electrical work in houses on Yew Tree Lane site, Johnson and Turner, Hyde, £1,120.

Gosforth U.D.C. Provision of street lighting along six roads in borough, B. L. Oliver, £3,661

Gravesend T.C. Rewiring of municipal offices, R. Hopkins and Sons.

London. Electrical installation for detritus pits scheme, London Electricity Board, £10,718; supply of two switchboards for primary sedimentation scheme, Yorkshire Switchgear and Engineering Co., Ltd., £5,188, and supply and installation of instrument and telephone cables for old reservoir sludge digestion instrumentation scheme, B.I.C.C., Ltd., £1,194.

Newcastle-on-Tyne. Supply and installation of cables at iron-ore quay at Tyne Dock for Improvement Commission, B.I.C.C., Ltd.

Northumberland. Electric lighting at Hexham grammar school, A. Moffett and Sons.

West Hartlepool T.C. Electrical installation at Briarfields Hostel, Heslop and Hall, Ltd.; supply of 700 yd of cable and 1,000 lamp holders for illuminations display at Seaton Carew, Imperial Lighting of London; and supply of 1,000 lamps for same, G.E.C., Ltd.

TRADE NOTES

Sales Office. Barlow-Whitney, Ltd., have opened offices in London at 2 Dorset Square, N.W.1 (telephone, Ambassador 5485), from which their Technical Sales Department now operates.

Change of Address. The London office of James Howden and Co., Ltd., and James Howden and Co. (Land), Ltd., is now at 15 Grosvenor Place, S.W.1. Telephone, Sloane 0611.

Agency. Insley (London), Ltd., 119 Oxford Street, London, W.1 (Tel.: Gerrard 8104), have been appointed agents in the United Kingdom for ball and roller bearings manufactured by the Kaydon Engineering Corporation, Muskegon, Michigan.

Expansion. Thames Electric Co. Ltd., have obtained an additional telephone line, i.e. Kingston 1474, and 6949.

Your Queries — Answered

"Polar Cub" drills, makers of? C.A.—A. C. Gilbert Co., New Haven, Connecticut, U.S.A. (22793)

"Saxon" pumps, makers of? T.E.—Jobson and Beckwith Ltd., 62 Southwark Bridge Rd., S.E.1. (22804)

Staircase switches, air leak type, makers of? E.E.—General Electric Co., Ltd., Magnet House, Kingsway, W.C.2; Power Equipment Co., Ltd., Kingsbury Works, Kingsbury Rd., N.W.9; Elkay Electrical Mfg. Co., Ltd., 42 Woburn Place, W.C.1. (22811)

"Prefect" washing machines, makers of? T.B.—Clegg and Coupe, Ltd., Molesworth St., Rochdale, Lancs. (22818)

Battery operated wall clocks, makers of? F.H.—Falkland Mfg. Co., Ltd., 35 Sefton St., Liverpool 8; Anglo Time Corpn., Brookhouse Mills, Blackburn. (22823)

"Princess Supreme" washing machines, agents for? E.B. L. G. Hawkins and Co., Ltd., 30/35 Drury Lane, W.C.2. (22830)

Chilled water dispensers, small capacity, makers of? S.B. — Non-Drip Measure Co., 88 Danbrook Rd., S.W.16; Frigidaire Division of General Motors Ltd., 401 Edgware Rd., The Hyde, N.W.9; Wm. Page and Co., Ltd., 87 Shaftesbury Ave., W.1. (22841

The above are selected from questions we have answered this week. If you have a query, send it to us.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Simpson Banks and Co. Ltd., 70 Ascot Terr., Leeds 9. Manufacturers and merchants of and agents for all electrical equipment, electrical contractors and maintenance engineers, etc. Cap.: £1,000. Dirs.: J. Simpson and Margaret Simpson.

Richard Burbidge and Co. Ltd., 15 Ship St., Brighton, Sussex. Electrical contractors, manufacturers of electrical goods, including dynamos, armatures, etc. Cap.: £2,000. Dirs.: to be appointed by subs. Subs.: H. Trohner and A. Segre.

Cowlans Ltd., 349 Forest Rd., Walthamstow, E.17. Electrical engineers and contractors, etc. Cap.: £100. Dirs.: S. Cowlan and Mrs. P. M. Cowlan.

R. G. Dixon (Worthing) Ltd., 5 Old Steine, Brighton. Electricians, radio and television engineers, etc. Cap.: £1,000. Dirs.: R. G. Dixon and Mrs. D. M. Dixon, H. G. Dixon and Mrs. I. M. Dixon.

Electran Coil Winding and Transformer Co. Ltd. To take over business of the Electran Coil Winding and Transformer Co., electrical engineers and contractors, etc. Cap.: £100. Dirs.: to be appointed by subs. Subs.: E. W. J. Wood, 73 Eton Rd., Ilford, Essex, and A. S. R. Armitage, 35 Bradbourne Park Rd., Sevenoaks.

Elgafrost Trading Co. Ltd., Halton House, 20-23 Holborn, E.C.1. Merchants, manufacturers of and dealers in electrical or gas apparatus and appliances, etc. Cap.: £100. Dirs.: C. A. Ruempol and Mrs. L. F. Ruempol.

Havant Engineering Co. Ltd., Selborne Rd., Brockhampton Lane, Havant, Hants. General, precision, mechanical, agricultural, motor and electrical engineers, etc. Cap.: £100. Dirs.: T. J. Spurgeon, J. N. Burrows and W. Burrows.

Industrial Mechanics Ltd., 2 and 3 Denmark Pl., Hornsey, N. Dealers in and selling agents and manufacturers of chemicals and chemical equipment and mechanical and electrical apparatus, etc. Cap.: £100. Dir.: D. C. Holland.

Lancashire Dynamo Switchgear Ltd., Bristol Rd., Bridgwater, Som. Cap.: £100. Dirs.: H. W. Bosworth, J. G. Shaw, S. G. Mundy and R. E. V. Ely.

PRICES OF CABLE METALS AND OTHER MATERIALS

(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	231 0 0	£220 0 0
LEAD, good soft pig (foreign)	163 0 0	152 0 0
" " " "English" quality ...	164 10 0	
Tin (99-99.75%) ... ...(Cash)	965½-965¾	—
" (3 months)	966½-966¾	—
ALUMINIUM, commercial purity (del.)	154 0 0	—
ZINC	190 0 0	156 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	59 10 0	—
Mild Steel Tape (0·04 in.)	39 15 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Joe Kenyon and Son, electrical engineers of Holmfirth, Yorks. At first meeting of creditors it was reported liabilities amounted to £9,331. Assets were valued at £8,940 and after allowing £111 for preferential claims, there were net assets of £8,829, or deficiency of £502. Resolution passed for appointment of R. L. M. Wood, C.A., of Huddersfield, as trustee of the estate, with a committee of inspection.

Swaning Electrical Co., Ltd., electrical contractors of London W.6. Last day for receiving proofs, May 10. Liquidator is J. M. Clarke, Official Receiver, Inveresk House, Strand, W.C.2.

BANKRUPTCY ACTS

Receiving Orders

Ipswich. Leonard A. L. Leech, electrical contractor trading as T. L. Installation Co. (Norfolk and Suffolk), at 129A Fore St., Ipswich. Date of receiving order, April 21. First meeting will take place 13A Gt. Colman St., Ipswich, on May 6, at 2.30 p.m., and public examination will be at the Shire Hall, St. Helens, Ipswich, on June 12 at 10.30 a.m.

Kingston-upon-Hull. Stanley Bailey, trading as Bailey and Round, refrigeration engineers at 103 Spring Bank, Kingston. Date of order, April 10.

First Meetings

Chester. John V. Barke, electrical engineer of 21 Circular Drive, Chester. First meeting will be held at Official Receiver's office, West Africa House, 25 Water St., Liverpool 2, tomorrow (Friday), at 11 a.m., and public examination at The Castle, Chester, on May 22, at 10.15 a.m.

Grimsby. Montague J. Hatton, electrical contractor trading as Hatton and Hanna at 128 Kingston Rd., New Malden, Surrey. First meeting at Official Receiver's office, 8 Flottergate, Gt. Grimsby on May 6, at 11.30 a.m., and public examination at the Town Hall, Gr. Grimsby, on June 5, at 11 a.m. Date of receiving order, April 18.

Application for Discharge

Kingston-upon-Hull. Cyril Davis and Robert Walster, electrical engineers, trading in partnership as Davis and Walster at 198 Hessle Rd., Kingston. (Separate application of R. Walster.) Hearing fixed for June 10 at The Guildhall, Kingston-upon-Hull.

Intended Dividends

Canterbury. Nicolas A. R. Spreeth and Stanley H. Price, trading in co-partnership as Refrigeration Installations Co. at Sea St., Herne Bay. Last day for receiving proofs, May 6. Trustee is E. C. Williams, Midland Bank Chambers, Herne Bay.

Hereford. Philip Thomas, radio and electrical engineer, trading at 4 New St., Ledbury. Last day for receiving proofs, May 7. Trustee is R. K. Clark, Somerset House, 37 Temple St., Birmingham, Official Receiver.

Portsmouth. Walter J. R. Ashley, wireless and electrical engineer, trading as Southern Wireless Services at 151 London Rd., North End, and at Warflete, Auckland Rd., West Southsea, Portsmouth. Last day for receiving proofs, May 6. Trustee is W. H. Meredith, Official Receiver, 16 Westwood Rd., Southampton.

Notice has been given that the following names of companies will be struck off the Register after the expiration of three months: Falmor Electrical Products, Ltd., and King Bros. (Electrical Enterprises), Ltd.

BUSINESS PROSPECTS

HOME

Andover T.C. It is proposed to build 86 houses in Leigh Road.

Aylesbury T.C. Tenders expected to be invited shortly for construction of 40 houses on various sites.

Ayr. Dean of Guild Court has approved alteration and erection of premises in Falklands Rd. to be used as cold storage warehouse for W. Milne Ltd. Estimated cost is nearly £3,000. Approval has also been granted for erection of buildings at Newton-on-Ayr railway station. Estimated cost of these is £11,000.

Barnet (Herts) U.D.C. Provisional plans approved for erection of 355 dwellings on Whitings Hill estate. Plans provide for flats, houses, shops and old people's homes.

Basingstoke T.C. It is proposed to erect 42 houses and eight flats on S. Ham site.

Billingham-on-Tees U.D.C. Ravenseft Properties Ltd., London, are to build 24 shops and 26 flats on a site on the council's proposed shopping centre. Architects are L. H. Fewster and Partners, 22 Conduit St., London W.1.

Bradford. Erection of 130 houses on Thorpe Edge estate and 10 in Haworth Rd. City Engineer and Surveyor, Town Hall.

Bridlington T.C. Erection of 80 dwellings on West Hill estate. S. Briggs, town clerk, Town Hall.

Brighton T.C. Erection of 270 flats on Hollingbury estate, Borough Engineer and Surveyor, Town Hall. Also erection of factory for K.D.L. Precision Engineers Ltd., at Hollingbury Light Industry Area. Town Clerk.

Carlisle. Erection of 76 houses and 76 flats on Harraby Neighbourhood unit. Gge. Connell and Son, Chartered quantity Surveyors, 25 New Bridge St., Newcastle-on-Tyne.

Chapel-en-le-Frith R.D.C. Forty-eight houses and four bungalows are to be built on three sites.

Chester T.C. Merseyside and N. Wales Board are to be asked to prepare revised specification for wiring of town hall. New tenders will be obtained for carrying out the work.

Cockermouth R.D.C. It is proposed to erect 40 houses at Clifton and tenders to be invited for six at Brigham.

Coventry. A. C. Wickman and Co., Ltd., propose to rebuild their fire-damaged factory in Banner Lane.

Cwmbran (Mon.). Licence has been granted to Guest, Keen and Nettlefolds Ltd., for erection of a £750,000 foundry.

Darlaston (Staffs) U.D.C. Approval granted for next section of building scheme on Bentley estate. It provides for about 230 houses and shops.

Darlington. The Tees Valley Water Board, Middlesbrough, is to spend £13,538 on electric cable and switchgear, and £4,387 on alternative electrical arrangements at Broken Scar pumping station.

Ealing T.C. Secondary school is to be built in Greenford Rd. for R.C. authorities; also a new church.

Great Yarmouth T.C. Construction of maisonnettes, flats and houses, totalling 64 dwellings, in Middlegate St. Borough Engineer, Town Hall.

Haddington T.C. Applications invited for inclusion on list of contractors for future development in burgh. Particular trade or trades should be specified. J. McVie, Town Clerk, Council Offices.

Hemel Hempstead T.C. Erection of 66 flats in three-storey blocks on Adeyfield estate. A. H. Turner, Borough Engineer and Surveyor, Market Square.

Irvine T.C. Dean of Guild Court has approved erection of 60 houses at estimated cost of £100,000.

Littlehampton (Sussex) U.D.C. It is proposed to build 250 houses on Wickbourne estate extension at cost of £396,000.

Longbenton U.D.C. Construction of 32 houses on Avondale estate. Engineer and Surveyor, Council Offices, Forest Hall, Newcastle.

Mirfield (Yorks) U.D.C. Permission sought to build 50 houses on Kitson Hill estate.

Monmouth R.D.C. Erection of 24 houses at Dingestow. J. H. Thraves, Council's Architect, 63 High St., Newport.

Northallerton U.D.C. Tenders are being obtained for erection of 54 houses in Linden Road.

Paisley T.C. Construction of 45 houses at Braehead. Burgh Engineer, J. A. McGregor, 14 Gilmour Street.

Ramsgate T.C. Approval sought for construction of 40 houses in Allenby Rd. and 158 houses in Highfield Road.

Scarborough T.C. Plans submitted for new factory in St. Thomas St. for Burkin, Wilkinson and Smith, Architects, Martin's Bank Chambers, Westborough, Scarborough.

Southwell (Notts). Coal Board is to build 314 houses in district for miners.

South Shields. Cairns and Byles Ltd., 21 Ellison Place, Newcastle-on-Tyne, have been appointed consultants for rewiring of Gilbert St. and Stanhope Rd. schools.

St. Ives (Hunts) T.C. Tenders expected to be invited shortly for erection of 22 houses in Houghton Road.

Stepney B.C. Erection of three blocks of flats totalling 124 dwellings in Cornwall St. scheme. Borough Engineer and Surveyor, A. A. Hudson, Municipal Offices, Duval St., E.1.

Stokesley R.D.C. Erection of 72 houses on six sites. Engineer and Surveyor, Council Offices, Stokesley, Yorks.

Watford R.D.C. Erection of 68 houses at Abbots Langley. Council's Architects, Dawe, Carter and Partners, 83 High Street.

OVERSEAS

Ecuador. The Municipality of Chimbo will shortly be requiring equipment for the construction of a power station. Items required include turbines to start from centre of pipeline, generators, voltmeters and ammeters, h.t. current elevators and wire, etc. Additional information may be had from the Municipality of Chimbo County, San Jose de Chimbo.

Mexico. Argostal, S.A., Diagonal 20 de Noviembre 149, Mexico 8, are interested in buying engine lathes, shaping machines, milling machines and drill presses with motors and controls for a.c., 3-phase, 220 V, 50 c/s current, and small bench lathes for a.c., single-phase, 110 V, 50 c/s current. Enquiries to F. Wiedemann at above address.

Peru. Supply of radio receivers, calculating and adding machines required for sale by Senor Leon M. Feldman, Portal de Flores 118, Arequipa.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Asbestal. B704,006. Class 9. Asbestos-insulated, aluminium-sheathed, electric conductors or cables. Pirelli-General Cable Works, Ltd., 343-345 Euston Road, N.W.1.

Chip. 703,965. Class 7. Plugs, incorporating a magnet, for insertion at predetermined positions in the lubricating or fluid circulating systems of machines, to extract magnetic particles therefrom. Uniscan Products, 10 Buckingham Courtlands, Richmond, Surrey.

Gyromax. 704,958. Class 10. X-ray tubes and housings therefor. Newton Victor Ltd., 15-19 Cavendish Place, W.1.

Henry Wiggin, with design. 701,307. Class 9. Anodes for electro-deposition, and electrodes for electric welding. Henry Wiggin and Co. Ltd., Sunderland House, Curzon St., W.1.

Megistor. 705,333. Class 9. Electric resistances. The Morgan Crucible Co. Ltd., Battersea Church Rd., S.W.11.

Mynomac. 703,893. Class 9. Electric switches other than time switches. C. H. Parsons Ltd., Britannia Works, Wharfdale Rd., Tyseley, Birmingham.

MEETINGS TO NOTE

THURSDAY, MAY 1

INST. OF FUEL.—"Railways and Coal." R. G. Jarvis. Inst. of Mechanical Engrs., Storey's Gate, S.W.1, 5.30 p.m.

FRIDAY, MAY 2

INST. OF MECHANICAL ENGRS.—"Control and Recovery of Dust and Fume in Industry." Robert Ashman. Storey's Gate, S.W.1, 5.30 p.m.

A.S.E.E. (Nottingham Branch).—Programme of electrical films at Electricity Showrooms, Smithy Row, 7.30 p.m.

A.S.E.E. (Liverpool Branch).—Lecturettes at Liverpool Engineering Soc., 24 Dale St., 8 p.m.

MONDAY, MAY 5

I.E.E. (S. Midland Centre).—"Railway Electrification in Gt. Britain." C. M. Cock. James Wall Memorial Inst., Birmingham, 6 p.m.

BRITISH INDUSTRIES FAIR. Opens today at Olympia, Earls Court and Castle Bromwich, continuing until May 16.

TUESDAY, MAY 6

I.E.E. (N. Midland Centre).—Annual Meeting. "The Maoris of New Zealand." Prof. A. Duward. 1 Whitehall Rd., Leeds, 6.30 p.m.

I.E.E. (N.W. Centre).—Annual meeting. "Design of High-speed Salient-pole a.c. Generators for Water Power Plants." E. M. Johnson and C. P. Holder. Engineers' Club, Albert Sq., Manchester, 6.15 p.m.

I.E.S. (N. Lancs sub-centre).—"Review of Research in Electricity Supply." C. W. Marshall. District meeting at Allen Technical Inst., Kendal.

I.E.E. (London Measurements Section).—"Electricity Division of National Physical Laboratory." R. S. J. Spilsbury. Savoy Place, W.C.2, 5.30 p.m.

I.E.S. (Liverpool Centre).—Annual meeting at Electricity Service Centre, Whitechapel, 6 p.m.

WEDNESDAY, MAY 7

I.E.E. (N. Lancs sub-centre).—"Review of Research in Electricity Supply." C. W. Marshall. Harris Inst., Corporation St., Preston, 7 p.m.

I.E.E. (Southern Centre).—"Technical Colleges and Education for the Electrical Industry." H. L. Haslegrave. Royal Beach Hotel, Portsmouth, 6.30 p.m.

BRITISH INSTN. OF RADIO ENGRS. (London).—"An Aerial Analogue Computor." W. Saraga, D. T. Hadley and F. Moss. School of Hygiene, Keppel St., W.C.1, 6.30 p.m.

THURSDAY, MAY 8

I.E.S. (Leicester Centre).—Annual meeting at Electricity Service Centre, Charles St., 6.30 p.m.

INSTN. OF WORKS MANAGERS (Wembley sub-branch).—"Introduction to Research Laboratories, G.E.C. Ltd." O. W. Humphreys. Rest Hotel, Kenton.

ENGINEERS' GUILD.—Discussion on "Development of an Engineer." H. J. B. Harding. Caxton Hall, Westminster, 6 p.m.

INCORP. PLANT ENGRS. (Newcastle Branch).—"Use of Low-grade Fuel in Shell-type Boilers." E. G. Ritchie. Roadway House, Oxford St., 7.30 p.m.

SWITCHGEAR AND COWANS

Record Demand; Works' Extensions

THE forty-first annual general meeting of Switchgear and Cowans Ltd., was held on April 24 at Elsinore Road, Old Trafford, Manchester, Mr. J. E. Chamberlain (chairman of the company) presiding.

The following is an extract from the directors' report which has been circulated with the accounts for the year ended December 31, 1951:—

You will have noticed from the profit and loss account that the figures show some improvement at £88,316 against £64,272 for the previous year.

The depreciation provision based on the revaluation of the group's fixed assets which took place in October, 1950, is increased to £32,495 as against £19,311 last year.

It will be seen from the consolidated statement that the stock and work-in-progress shows an increase from £197,684 to £268,786. This is a healthy position in view of present shortages of raw materials and the probable increase in prices.

There is an increase in the bank loan and a drop in the surplus of current assets over current liabilities which has come about due to a further investment in additional fixed assets amounting to approximately £50,000.

Dividend and Bonus

The directors recommend a dividend of 20%, plus a bonus of 2½% less tax at 9s 6d in the £ on the 600,000 Ordinary shares.

You will be interested to know that never in the history of your company has there been such a demand for its products, and we have, at the moment, an order book which is greater than ever before. Although this can be explained to a certain extent by the general trend of the market, there is a more important reason. We gave you a report last year on the technical improvements which had been made and details of further progress are given later. It is the prestige earned by your company's products, which are second to none in their field and in certain branches lead the industry, that has accounted for the fact that the demand exceeds our capacity to produce them. On new designs many orders have been received before we have had time to tool up properly, and the limited capacity of our present factory has forced us to refuse certain large contracts.

Increased Productive Capacity

With this situation facing us we have had to take

steps to increase our productive capacity at a time when difficulties in building, materials, plant and labour, are being experienced. We have purchased an existing factory in the neighbourhood, which has room for extension, as the possibility of obtaining permission to build a new factory seems remote. Even so it has taken us over four months to obtain a small building licence to carry out the few necessary alterations to adapt it for our purpose.

As, however, this work is now proceeding we hope to be able to commence production there very shortly and during the second half of this year add considerably to our output. This will still be insufficient but will help until we can obtain permission for further extensions, in finance, building and plant. We may say, however, that everything is being done to cope with the situation from our present resources and obtain by increased efficiency the desired results.

Research and Development

Under the heading of research and development, we reported, last year, the various activities on which the company was engaged. The improvements to the existing designs are now fully established and are in production.

The new types which were being developed are now either in production or coming into production, and markets are already assured.

High Voltage Switchgear: Under this category further improvements have been effected and a larger range is available without increasing the number of types manufactured. Further designs are now under consideration.

Low Voltage Switchgear: The new range of air circuit-breakers is in steady demand and the range of current ratings has been increased to 4,000 amperes.

Flameproof apparatus embodying air circuit-breakers and contactors is in heavy demand and its development has been fully justified.

Highly Successful Tests

In line with the declared policy, further short circuit tests were carried out during the last twelve months, extending the application of the standard range of switchgear.

These tests were again highly successful and the following certificates obtained:—

1.	MF/L1.	5 MVA	600 V BS.936
2.	MRS.	7.5 MVA	600 V BS.116
3.	A.50	100 MVA	3,300 V BS.116
4.	A.50	150 MVA	6,600 V BS.116
5.	A.51	150 MVA	6,600 V BS.116
6.	A.51	150 MVA	11,000 V BS.116
7.	A.71	250 MVA	6,600 V BS.116
8.	A.71	250 MVA	11,000 V BS.116
9.	R.A.	250 MVA	6,600 V BS.116
10.	R.A.	250 MVA	11,000 V BS.116

1 and 2—Flameproof gear.

3 and 4—Plain break oil circuit-breakers.

5, 6, 7 and 8—Arc controlled oil circuit-breakers.

9 and 10—Hand closed oil switches for Ring Main Services.

As may well be imagined, the load on our staff and workpeople is, at the moment, great, but they are responding in their usual manner and we are sure that you would like us to convey to them our appreciation and thanks.

The report and accounts were unanimously adopted.

THE RHEOSTATIC COMPANY

Satisfactory Results

THE fifteenth annual general meeting of the Rheostatic Company, Ltd., was held on April 29 at Slough.

Mr. M. J. GARTSIDE, B.SC.(Eng.), A.M.I.E.E., M.Amer.Soc.H. and V.E. (chairman), in the course of his speech said : "Once again it is my pleasure to report to shareholders very satisfactory trading results. Both in the home and export markets sales were appreciably higher. The profit before taxation was a record at £98,542. This attracted a record taxation of £60,800, leaving a net profit of £37,742 only. The Board recommends a final dividend of 12½%, making a total of 16½% as last year, payable on the increased Ordinary stock capital of £196,000.

Expansion of Production Capacity

During the past year orders have exceeded production capacity. Further expansion has now been made possible by the completion of extensions at the Frimley works and the leasing of additional premises to serve as a machine shop at Farnham, Surrey, but these are adequate only to meet current demand. Consequently, deliveries are still long, and result in some loss of business.

The necessity for thermostats, motorised valves and other equipment for the control of central heating, air conditioning and automatic firing equipment such as coal stokers, oil and gas burners, etc., is stressed by the Government's recently announced additional support of fuel economy measures and gives us reason to believe that in spite of the curtailment of some building programmes, the demand for our products will be maintained. Some recession exists in the home market for domestic controls for electric cooking which, although not welcomed, enables us to make some improvement in general delivery times. The company continues to work for the defence programme.

Despite recent import restrictions in Australia, which has always been a valuable market to your company, the total export sales continue to increase and for the first six months of the current financial year average monthly despatches overseas were 20 % higher than for the previous year. Since the last annual general meeting visits have been paid by myself and other executives to South America, South Africa and Canada in addition to the majority of Western European countries. The interest in our new design of resistor, referred to a year ago, has resulted in substantial orders. The growth of the subsidiary companies is evident.

Referring now to the current financial year, results so far indicate to your Board that with continuance of present trading conditions, the profit should not be less than that for the last.

With rise of wages in the engineering industry and higher costs of materials, increase of price levels has been necessary on all our products. We have been able to keep this increase to a minimum by the co-operation of our employees throughout the organisation in maintaining a high standard of productive efficiency. The report was adopted.

For Reliable electric power supply

One of three 65,000 kVA 11·6/146 kV 3-phase type ON/OFB Hackbridge Transformers installed at Hams Hall, "B" Power Station, Birmingham.

HACKBRIDGE TRANSFORMERS

Hewittic Rectifiers in traction service in Canada (British Columbia Electric Co.). Each bank has a capacity of 1,500 kW with class III railway service overloads (British and American standards). The total capacity of Hewittic rectifiers installed on this system is approximately 30,000 kW.

Hewittic Rectifiers

Hackbridge Transformers and Hewittic Rectifiers have built up leading reputations in their respective fields of a.c. and d.c. supply.

Modern developments in electricity distribution, industry, and electric traction, are making ever increasing demands, both at home and overseas, for this world-famous equipment.

HACKBRIDGE AND HEWITTIC ELECTRIC CO. LTD., WALTON-ON-THAMES, SURREY

Telephone: Walton-on-Thames 760 (8 lines) Telegrams: "Electric," Walton-on-Thames

Not too thick . . .

Not too thin . . .

85% of the light from a fluorescent lamp is provided by the coating of powder on the inside of the tube, and to get the highest efficiency and lumen maintenance, a critical amount of fluorescent powder is required on the tube. Too little powder will leave clear spaces between the particles and the ultra-violet radiation from the discharge will not be used efficiently; too thick a coating will absorb some of the light generated.

The viscosity of the powder suspension is the main factor affecting this powder weight and checks on coated tubes are taken throughout manufacture to avoid any drift from the desired standard.

Quality control ensures uniform excellence.

The illustration shows a viscosity test on fluorescent powder suspension, using a "Ford cup" and stop watch.

METROVICK LAMPS

Quality control - throughout

METROPOLITAN-VICKERS ELECTRICAL CO. LTD., ST. PAUL'S CORNER, 1-3 ST. PAUL'S CHURCHYARD. LONDON E.C.4

Member of the A.E.I. group of companies

S/F106

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED • FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

CITY OF PETERBOROUGH

THE COUNCIL invites TENDERS from recognised electrical contractors for the ELECTRIC LIGHTING and POWER INSTALLATIONS to 170 permanent houses on the Dogsthorpe North Estate, Peterborough.

Drawings, specifications and forms of tender may be obtained on application to F. J. Smith, M.B.E., A.M.I.C.E., City Engineer and Surveyor, Town Hall, Peterborough.

Applications, before noon on Saturday, May 10, 1952, should be accompanied by a cheque for the value of £2 2s., made payable to the Peterborough City Council, which will be returned on receipt of a bona fide tender or the return of the documents.

The Council does not bind itself to accept the lowest or any tender.

C. PETER CLARKE,
Town Clerk.

Town Hall,
Peterborough.
April 19, 1952. (S 189)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

BRITISH ELECTRICITY AUTHORITY

Southern Division

BRITISH ELECTRICITY AUTHORITY, Southern Division invite applications for:—

309. GENERAL ASSISTANT ENGINEER
System Operation Department.

Applicants should have a Higher National Certificate (Electrical) or its equivalent and should have some experience in the operation and control of interconnected power systems, or in the operation of power station plant.

Salary N.J.B. "AX/CX" 8, £481 to £655.

310. ASSISTANT CHEMIST
Poole Generating Station.

Applicants should have had practical experience of fuel, water and oil testing appropriate to a modern generating station. A knowledge of boiler chemistry for high steam pressures and temperatures will be an advantage. Preference will be given to candidates possessing a Higher National Certificate in Chemistry or its equivalent. Housing accommodation may be available for the successful candidate.

Salary N.J.B. H/11, £587 to £607.

311. SHIFT CHARGE ENGINEER
Southampton Generating Station.

Applicants should be in possession of technical qualifications admitting to corporate membership of a recognised professional institution, have had previous experience in a large modern generating station and preferably have had manufacturing works experience.

Salary N.J.B. F/7, £677 to £696.

Application forms may be obtained from P. D. A. Oliver, Divisional Secretary, 111 High Street, Portsmouth and must be returned by May 16, 1952. (S 207)

WAR DEPARTMENT

C.R.E. Shoeburyness

CLERK OF WORKS VACANCIES

VACANCIES exist in the Establishment of the C.R.E., Shoeburyness, for a temporary CLERK OF WORKS (ELECTRICAL), Grade III, and a temporary CLERK OF WORKS (MECHANICAL), Grade III.

Applicants between the ages of 21 and 60 years must be in possession of Ordinary National Certificates in electrical or mechanical engineering, or be able to show evidence of an equivalent standard of technical education and five years' apprenticeship or its equivalent with an engineering concern giving a good comprehensive training.

Salaries payable will be on a range of £460 (linked to age 26) x £20 to £575 a year (London rate), less provincial deductions ranging from £23 a year at a minimum to £30 a year. This salary scale is at present subject to pay addition of 10% up to £500 a year, plus 5% on pay over £500 a year. The starting pay of successful candidates will be determined by age and/or experience.

Letters of application, giving age and brief details of experience and qualifications, should be addressed as soon as possible to the C.R.E., Old Ranges, Shoeburyness, Essex. (S 190)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

SHIFT CHARGE ENGINEERS are required at (a) Hams Hall "A" and (b) Walsall Generating Stations. N.J.B. service conditions, superannuable appointments, commencing salaries within Schedule "A", (a) Grade J7, £792; and (b) Grade G7, £704.

Higher National Certificate in electrical or mechanical engineering required, and for (a) corporate membership of the Institution of Electrical or Mechanical Engineers will be an advantage. Applicants should also have had sound technical training and practical experience in the control and operation of a large power station. For (a) a knowledge of pulverised fuel firing is essential.

Write for entrance forms, stating vacancy applicable, to Establishments Officer, 53, Wake Green Road, Moseley, Birmingham 13. Closing date May 17, 1952.

F. W. LAWTON,
Divisional Controller.
(S 205)

MIDLANDS ELECTRICITY BOARD

GENERAL ASSISTANT ENGINEER required in the Construction Section of the South Staffs and North Worcs. Sub-Area. Experience necessary in the erection and installation of sub-stations, switchgear and transformers, etc., up to and including 33 kV both by direct labour and by contract. A knowledge of testing and protective systems is desirable. Technical qualifications an advantage. Salary £596 p.a. (N.J.B. Class "L", Grade 13) superannuable.—Apply within 14 days stating age, education, qualifications, experience, present position and salary to Sub-Area Manager, (Ref. C.W.) Midlands Electricity Board, Toll End Road, Tipton, Staffs.

A. STEPHENS,
Secretary.
(S 208)

MIDDLESEX COUNTY COUNCIL

Architect's Department

ELECTRICAL ENGINEERING ASSISTANT A.P.T.11. £500-£545 inclusive. Appointment at grade minimum. £10 less if under 26. Established, pensionable, subject to medical assessment and prescribed conditions. Should have served apprenticeship in wiring installation work and be now employed on design of electrical services for large public buildings, and able to work with minimum of supervision. Application forms (s.a.e. f'cap) from County Architect, 1 Queen Anne's Gate Bldgs., Dartmouth St., S.W.1, to be returned by May 20 (quoting K.733 E.T.). Canvassing disqualifies. (S 217)

CENTRAL ELECTRICITY BOARD
FEDERATION OF MALAYA

ELECTRICAL ENGINEERS

required by the **Central Electricity Board, Federation of Malaya.** Option of appointment either on agreement for 3 years in the first instance, leading, subject to satisfactory service, to an offer of permanent employment on the pensionable establishment, with opportunity of terminating appointment at the end of the first year's service, if so desired, or on contract for 7 years with full pay, leave after one tour of 3-4 years, and a gratuity on satisfactory completion of final service at the rate of £50 or £70 for each completed period of 3 months' service, according to salary. Salary (including allowances) payable in local currency equivalent at present Government rate of exchange to £1,078, rising to £1,988 a year. Commencing salary according to qualifications, war service and experience. Additional allowance payable to married men according to dependants. Free passages. Liberal leave on full salary. Candidates should preferably be Corporate Members or Graduates of the Institutions of Electrical or Mechanical Engineers, or alternatively possess degrees or other educational qualifications, carrying exemption from the Institution Graduateship Examinations. Those who are not so qualified would be eligible for salary on a lower scale, equivalent to £1,057 rising to £1,757 a year. Candidates for MECHANICAL WORK (M.28370.B) must have had sound training in both electrical and mechanical engineering, with experience in the operation and maintenance of diesel-alternator generating plant of up to 1,000 kW units. Candidates for ELECTRICAL DISTRIBUTION WORK (M.25016.B) must have had sound training in both electrical and mechanical engineering with experience in the operation of medium electricity supply undertakings and possess a competent knowledge of the erection and maintenance of high- and low-tension overhead and underground a.c. distribution systems and sub-station plant.

Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting on letter the reference number against the appointment for which application is made. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (S 201p)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for following superannuable posts. Conditions of service and salaries in accordance with N.J.B. Agreement, Schedule "A", inclusive of London Allowance.

STATION SUPERINTENDENT
Barking "C" Generating Station.

Qualifications: sound technical training and wide practical experience in electrical and mechanical engineering and in power station practice. Candidates must be competent works managers and good organisers, and have had practical experience of negotiating and consultative committees, and in the promotion of good labour relations.

The officer will be responsible for the general management and operation of the station, Class "J", Grade 1, £1,341 p.a.

DEPUTY STATION SUPERINTENDENT
Barking "C" Generating Station.

Qualifications: similar to above.

The officer will be required to assist the Station Superintendent in general management and operation of the station, Class "J", Grade 3, £1,129 p.a.

SHIFT CHARGE ENGINEER
Battersea Generating Station.

Qualifications: sound engineering training with technical qualifications to Higher National Certificate standard, and experience in operation of modern high pressure, high temperature power station plant. Class "L", Grade 7, £946 1s. p.a.

STATION SHIFT CONTROL ENGINEER
Barnes Generating Station.

Qualifications: good general education and technical training. Previous experience in operation and control of E.H.T. switchgear essential, together with knowledge of d.c. and a.c. L.T. distribution and rotary convertors. Class "C", Grade 10, £507 p.a.

Applications, stating age, qualifications and experience to Divisional Secretary, B.E.A., London Division, Ergon House, Horseferry Road, S.W.1, within 14 days of this advertisement.

H. V. PUGH,
Divisional Controller.
(S 206)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY No. 712—JUNIOR ENGINEER (EFFICIENCY) at No. 2 Sub-Division, situated at Kearsley Generating Station, Stoneclough, near Manchester. Commencing salary, £375, rising to £552 (N.J.B. AX/DX.9). Duties will be day work and include recording and compilation of statistical data, together with general assistance during steam plant testing. Possession of H.N.C. (Mech.) will be an advantage.

VACANCY No. 713—JUNIOR ENGINEER, Agecroft H.P. Generating Station, Salford, Lancs. Commencing salary £375 rising to £471 (N.J.B. G.16/14). Duties, involving shift work, will lie mainly in the Control Room.

VACANCY No. 714—SHIFT CHARGE ENGINEER, Stuart Street Generating Station, Manchester. Salary £747 to £778 (N.J.B. H.7).

Apply, quoting vacancy No., to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before May 10. (S 200)

APPLICATIONS are invited by a progressive light to medium mechanical and electrical engineering Company, situated sixteen miles from London, for the post of GENERAL SALES MANAGER. The Company are fully equipped to manufacture non-mass production products of a mechanical and electrical nature such as specialised automatic machinery and appliances, switches, power panels, emergency electrical gear, marine electrical distribution boxes and panels, main switch panels and mechanical and electrical products of a general character. The Company also conducts a large business in the general illumination field of which street lighting is a prominent feature, therefore it is desirable that the applicant have knowledge and experience of the technicalities of street lighting. The appointment should be attractive to a first class administrator and organiser who has connections and experience in the sales of products specified and the appointment should, subject to satisfactory service, lead to a seat on the Board of the Company. Please write in strict confidence giving full details of qualifications, experience and salary required.—Box No. 1695, Electrical Times. (S 218)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, *or a woman aged* 18-59; *unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order*, 1952.

(A) SHIFT ENGINEERS are required for a large sea-water distillation plant and power station now being built for the Government of Kuwait in the Persian Gulf. In the first instance, the distillation plant will be capable of distilling one million gallons of water per day from sea water and the power station will have a total capacity of 30,000 kW. For men of experience, a starting consolidated salary of £1,600 per annum is offered to suitable applicants. This may be varied according to experience. Applicants should have had at least three years experience in a similar position.

(B) ASSISTANT ELECTRICAL MAINTENANCE ENGINEER is required for a large sea-water distillation plant and power station now being built for the Government of Kuwait in the Persian Gulf. In the first instance, the distillation plant will be capable of distilling one million gallons of water per dav from sea water, and the power station will have a total capacity of 30,000 kW. For men of experience, a starting consolidated salary of £1,500 per annum is offered to suitable applicants. This may be varied according to experience. Applicants should have had at least three years experience in a similar position.

(C) QUALIFIED POWER STATION CHEMIST is required for a large sea-water distillation plant and power station now being built for the Government of Kuwait in the Persian Gulf. In the first instance, the distillation plant will be capable of distilling one million gallons of water per dav from sea water, and the power station will have a total capacity of 30,000 kW. For men of experience, a starting consolidated salary of £1,500 per annum is offered to suitable applicants. This may be varied according to experience. Applicants should have had at least three years experience in a similar position.

Free furnished accommodation, when available, will be provided in addition to the salary, but State employees are required to pay for their own messing and servants. In the first instance the term of service will be one year and, if satisfactory, the contract may be extended a further two years. The rate of leave for the last two years will be 60 days per year of service.

Applications, in writing, giving full particulars of training, qualifications and experience, should be addressed in the first instance to The Secretary, Ewbank and Partners, Ltd., Engineering Consultants, 10/11 Grosvenor Place, London S.W.1. (S 167)

CONSULTING ENGINEER'S office has the following executive position to fill: ELECTRICAL ENGINEER to undertake work of power and lighting generation and distribution, installation of diesel generating sets.

Candidate to be fully qualified and be Corporate Member of the Institution of Electrical Engineers. He will be in charge of his own section and be responsible for the preparation of detailed work and specifications. Headquarters of the organisation is in the West End of London. The salary will be commensurate to that of the position offered and successful candidate will be eligible for the firm's pension scheme.

Applications should be made in writing in the first instance, submitting a detailed curriculum vitae of the training and career of the applicant.—Write: Box No. 1685, Electrical Times. (S 194)

CONSULTING ENGINEERS in the north of England require MECHANICAL and ELECTRICAL DRAUGHTSMEN and JUNIOR ENGINEERS, having some knowledge of design and layout of large electricity generating stations.—Application should be made not later than May 10 to Box No. 1677, Electrical Times. (S 170)

DEPUTY PLANT SUPERINTENDENT required for a large sea water distillation plant and power station, now being built for the Government of Kuwait in the Persian Gulf. In the first instance, the distillation plant will be capable of distilling one million gallons of water per day from sea water and the power station will have a total capacity of 30,000 kW. Applicants should have held a similar position for at least three years. Preference will be given to applicants who have some knowledge of chemistry and they should be trained either as mechanical or electrical engineers. The term of service in Kuwait will be, in the first instance, two summers, after which leave at the rate of 60 days per annum will be allowed on full salary. When available, free furnished accommodation will be provided in addition to the salary, but employees are required to pay for their own messing and servants.—Applications, in writing, giving full particulars of training, qualifications and experience, should be addressed in the first instance to the Secretary, Ewbank and Partners, Ltd., Engineering Consultants, 10-11, Grosvenor Place, London S.W.1. (S 166)

DESIGNERS and DRAUGHTSMEN with experience in electronic or light mechanical engineering are required by the G.E.C. Research Laboratories, Wembley, Middlesex, for work at Stanmore. Vacancies exist for seniors with good academic qualifications and also for juniors. Excellent and interesting openings with good prospects.—Apply to the Staff Manager (Ref. GBLC/S/886), stating age and record. (S 191)

ELECTRICAL ENGINEER with 3-5 years' post-graduate experience is required for the design of special types of small motors and generators to form part of a complete electro-mechanised system.—Applications, in writing, to be sent to the Staff Manager (Ref. GBLC/S/887), Research Laboratories of The General Electric Co. Ltd., Wembley, Middlesex, stating qualifications, age and experience. (S 192)

EWBANK AND PARTNERS LTD., have vacancies for the following:—

ELECTRICAL ENGINEERING DRAUGHTSMEN experienced in power station and sub-station distribution systems.

MECHANICAL ENGINEERING DRAUGHTSMEN experienced in power station design and layout, pipework layout, circulating water systems or coal and ash handling plants.

TRACERS (FEMALE) experienced in power station and general engineering work.

The positions are permanent and are pensionable. Free lunches are provided and a five-day week is in operation. —Applicants should write in first instance, stating age, details of experience and salary required to: The Secretary, Ewbank and Partners Ltd., Engineering Consultants, 10/11 Grosvenor Place, S.W.1. (S 115)

FERRANTI LTD., Transformer Department, has a vacancy for a METHODS ENGINEER for production development work on power transformers. Previous experience in the manufacture of transformers is desirable but the first essential is a good mechanical engineering background. This would be a permanent staff appointment with pension benefits.—Forms of application from Mr. R. J. Hetherington, Staff Manager, Ferranti, Ltd., Hollinwood, Lancs. Please quote reference TME. (S 165)

GENERAL FOREMAN required for S.E. London factory (70 employees). Must have specialised knowledge and experience of transformer and rectifier manufacture and also electrical assemblies. Additional manufacturing experience of small resistance welding machines would be a definite advantage.—Write, giving details of experience and salary required, to Box No. 1689, Electrical Times. (S 210)

GRADUATE OR QUALIFIED ELECTRICAL ENGINEER required in the cable design and technical service section of British Insulated Callender's Cables, Ltd., at Leigh, Lancs. Experience in the manufacture and/or design of rubber and thermoplastic cables desirable.—Applications, stating age, salary required, and giving full details of experience and qualifications, should be addressed to the Staff Officer, B.I.C.C., Ltd., Prescot, Lancs. Excepted persons only. (S 209)

MECHANICAL ENGINEERING DRAUGHTSMAN with experience of gyroscopes is required for work at Stanmore by the Research Laboratories of The General Electric Co. Ltd., Wembley, Middlesex.—Apply to the Staff Manager (Ref. GBLC/S/888), giving details of age and experience. (S 193)

FOSTER TRANSFORMERS & SWITCHGEAR LTD.

South Wimbledon, S.W.19

require

TRANSFORMER DRAUGHTSMEN

and

TRANSFORMER TESTERS

Annual bonus in addition to generally recognised pay rates. Good working conditions in modern factory with welfare and canteen services and active Sports and Social Club. Conveniently situated with good tube and bus services. Apply to the Personnel Officer. (S 139p)

POWER PLANT SHIFT CHARGE ENGINEER required by The Steel Company of Wales Ltd. Applicants should have served a recognised apprenticeship with a major engineering company, and have a sound general and technical education.
Experience in the following is desirable:—
(a) As Shift Charge Engineer.
(b) High pressure boiler and turbine operation.
(c) Operational control of an interconnected h.t. industrial network.
(d) Other works auxiliary services.
Salary according to age and experience. The post will be permanent and pensionable on satisfactory service.—Applications in own handwriting should be addressed to: The Personnel Superintendent, The Steel Company of Wales, Ltd., Box No. 3, Port Talbot. (S 147)

QUALITY CONTROL SUPERVISOR for manufacture of Paper Ins. Power Cables up to high voltages. National Certificate standard with knowledge of Power Cable materials. Previous manufacturing experience an advantage. Age 22 to 30 years. Good salary with prospects.—Apply in writing to Staff Officer, British Insulated Callender's Cables, Ltd., Belvedere, Kent. (S 219)

SENIOR ELECTRICAL ENGINEERING DRAUGHTSMAN required, H.N.C. desired but not essential. Experience required in power and lighting layouts, overhead and underground distribution schemes, power station and sub-station layouts. Five-day week.—Apply to Personnel Manager, Kellogg International Corporation, Stone House, Bishopsgate, London E.C.2. (S 164)

APPOINTMENTS WANTED

PUBLICITY MANAGER seeks post with industrial organisation. Industrial, electrical and advertising agency experience. Technical and prestige advertising, brochures, exhibitions, public relations, sales promotion. —Box No. 1697, Electrical Times. (S 221)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed. Edgware 8631 (4 lines). —Service Electric Co., Ltd., Stanmore, Middx. (D 324)

CAPACITY now available in our new works for winding stators, rotors, armatures and field coils from fractional up to 1,000 h.p.—Pearn, Greg & Armstrong Ltd., Hewitt Street, Knott Hill, Manchester. (S 188)

CAPACITY, Plastic compression and injection moulding. Toolmaking.—Greenwood Rawlins and Co., Ltd., Brook Road, Arterial Road, Rayleigh, Essex. (S 175)

CASTINGS. Fisher Foundries Ltd., Greet, Birmingham. have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham. Victoria 0197. (P 570)

METALWORK. All types, cabinets, chassis, racks, etc., to your own specifications —Philpott's Metalworks Ltd., Chapman Street, Loughborough. (P 695)

ZEROS REFRIGERATORS. Complete range of REPAIR AND SERVICE now available. Equipment reconditioned to conform to pre-war manufacturers' specifications.—Time Engineers Ltd., Refrigeration Specialists, 60 Southend Road, Rainham, Essex (Rainham 2358), or Southern Area Agency (Tel.: Springpark 4217). Electrical spares supplied to the trade. (S 96)

WANTED

A.C.—D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co. Ltd., 67 Rothschild Road, Chiswick Park, W.4. Tel.: Chiswick 5105. (A 20)

BALL, Roller and Taper Roller Bearings purchased. Good prices paid.—Offers to Berend and Berend Ltd., 62 Berners Street, London W.1. (R 333)

"MEGGER" required, 500 V. Insulation 0-50 megs, Continuity 10 ohms.—Particulars, Morris Electric Ltd., 615 Bordesley Green, Birmingham 9. (S 222)

ONE 100 amp 4-pole CHANGE-OVER SWITCH, new or used, in good condition.—J. E. Wildbore Ltd., Peter Street, Oldham (Main 4475). (S 202)

REVOLVING FIELD-TYPE ALTERNATOR, 150 kVA, 100 cycles, voltage and speed immaterial. Must be in sound mechanical condition. Ball-bearing machine preferred.—Full details to Box No. 1661, Electrical Times. (S 204)

£50,000

Immediate cash available for purchase of New Ball and Roller Bearings, all types, Steel Balls and Rollers. Top prices paid, small quantities accepted.

CLAUDE RYE LTD.,
895-921 Fulham Road, London, S.W.6
RENown 6174 (20 lines) (S 23p)

SURPLUS STEEL STOCKS wanted. Strips, bars, sheets, etc.—Details to Morleys (Birmingham) Ltd., Regina Works, Alcester Street, Birmingham 12. (P 498)

WANTED, All types of Stationary Diesel Engines. Also Horizontal Hornsby Lamp Start Paraffin Engines.—Sippy and Co. Ltd., 118 Pepys Road, London S.W.20. Tel.: Wimbledon 5964. (S 125)

WANTED, ROTARY CONVERTORS, any size.—Universal, 221 City Road, London E.C.1. (A 16)

WANTED, Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube Boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling. —Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath. (A 5)

WANTED, MAWDSLEY GENERATORS, 65/85 V, 105 amps, 1,750/2,900 r.p.m., 6.75 kW.—C. G. and W. Young, 15 Colne Road, Twickenham. POP. 5168. (S 196)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper Ltd., 176 Brady Street, Bethnal Green, E.1. (A 1)

WANTED, D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co. Ltd., 22-36 Britannia Walk, London N.1. (A 13)

WANTED: Surplus Stocks of Twist Drills, Milling, Cutters, Hacksaw Blades, Reamers, Chasers and all kinds of hand and cutting tools.—Send details to B. Draper and Son, Kingston Hall Road, Kingston-on-Thames. (A regular buyer of surplus tools.) (R 434)

37½ GAUGE (0·0064 in.) ENAMELLED and S.S.C. WIRE, white and coloured. Must be pure silk covered. Any quantity up to 500 lb.—Box No. 1691, Electrical Times. (S 211)

FOR SALE

CABLES & WIRE

COPPER WIRE. Substantial quantities of tinned or bare available at competitive prices, especially swg 36 and 40 stranded.—Box No. 1699, Electrical Times. (S 223)

D.C.C. COPPER WIRE. Available for immediate delivery. 57 lb 3 s.w.g.; 158 lb 20 s.w.g.; 511 lb 21 s.w.g.; 150 lb 22 s.w.g.—Hirst, Ibbetson and Taylor Ltd., 47/55 Chapel Street, Salford 3, Lancs. (S 153)

ENAMELLED COPPER RESISTANCE WIRES—SILK and COTTON-COVERED INSULATION. Usually stock.—Send inquiries: The Saxonia Electrical Wire Co. Ltd., Roan Works, Greenwich, S.E.10. (S 176)

GALVANISED STEEL WIRE ROPE (¼ in. diameter) for overhead suspension of electric cables employed in lighting zebra pedestrian crossings, sea-front illuminations, electric railways, trolleybuses, etc. Immediate delivery, at considerably below present maker's prices, special discounts large orders.—Dominion Sales (London), 6 Finsbury Square, E.C.2. Tel.: Metropolitan 9017-8. (S 177)

TINNED STEEL ARMATURE BINDING WIRE. All sizes from 14 s.w.g. to 30 s.w.g. supplied in coil or on reels.—Frederick Smith and Co., Wire Manufacturers Ltd., Caledonia Works, Halifax. (N 20)

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FROM STOCK, MOST SIZES AVAILABLE

from ½ in. - 2 in. dia.

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Telephone: MAIDA VALE 5477, 5489, 8641.
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NEW BALL RACES, ROLLER, THRUST AND TIMKEN RACES in stock. Advise requirements.

CLAUDE RYE LTD.,

895-921 Fulham Road, London, S.W.6

RENown 6174 (20 lines) (S 21p)

BROWN PORCELAIN LINE INSULATORS. Brand New. American pattern approximately 5¼ in. overall; aperture for ¾ in. cable. Only a few left, 1/6 each in boxes of 100. Cash with order.—John Cashmore Ltd., Great Bridge, Tipton, Staffs. (S 76)

FOR sale. Sciaky Electric Spot Welder, portable type PH90/180 Suspension Model. Max. kVA 380, normal kVA 180, min. kVA 36. No reasonable offer refused.—Apply: The Superheater Co. Ltd., Mosley Road, Trafford Park, Manchester 17. (S 198)

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GREY IRON and all Non-Ferrous METALS

Machining and Pattern Making

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50 TONS NEW OFFCUTS, ANGLES, STRIP, etc.—47 Birdwood Grove, Fareham, Hants. (S 197)

500,000 MAGNETIC AND ELECTRICAL ALLOYS Radio Metal "I" laminations, Type 39, .015 in. thick. 64,000 Silcor "E" laminations, Type 70, .014 in. thick for immediate disposal.—Box No. 1693, Electrical Times. (S 213)

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Metal Thread Bolts, 3/32, ¼, 5/32 and 3/16 in., in various lengths.

Also OBA, 2BA, 4BA, 6BA Nuts, Bolts, Screws. C.S.K. Brass and Steel.

¼ Dome Nuts, Brass and Chrome. Keenest prices.

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Tel.: Anfield 2319.

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IMMERSION HEATERS. Grubb 4 kW, no purchase tax. All lengths 16 in. to 36 in. Standard voltages. Provision for intermediate loadings. Fully guaranteed. Prompt delivery.—Write for latest lists and trade terms to Distributors, John Owner and Co. Ltd., Springfield Road, Birmingham 13. Tel.: Springfield 2939. (C 392)

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AT THE RIGHT PRICE

Two brand new 50 kW "National" Diesel Sets, completely self-contained, radiator cooled;

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FOR sale. Brand new POWER UNITS by "Pioneer," Chicago, d.c.—a.c. Output on a.c., 250 W, 230 V, 60 c/s at 1,800 r.p.m. Output on d.c., 250 W, 15 V, at 1,800 r.p.m. Packed in original cases. Price £40 each, loaded f.o.r. Fareham.—Box No. 1687, Electrical Times. (S 203)

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by

HOUCHIN

100 kVA GMC generating plant now available for almost immediate delivery to the home market only.

Incorporating the famous HLD alternator

Details and specification on request from the actual manufacturers:

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TANGYE 34 b.h.p. HORIZONTAL DIESEL ENGINE for sale. Speed 310 r.p.m. Direct engine, cold air starting, back charged air receiver. Exhaust silencer, fuel tank. Photo etc.—F. J. Edwards Ltd., 359 Euston Rd., London N.W.1. (S 220)

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PURLEY CHOKES AND BALLASTS. Our 80 W Tapped h.p.f. Ballast, with Starter Switch-holder incorporated, is proving itself the most popular unit. Suitable for most fittings. 57/6 each, subject.—F. W. Blanshard Ltd. (Dept. ET), Purley, Surrey. Uplands 4818-9. (E 343)

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A. A. ELECTRICAL CO FOR A.C.—D.C. MOTORS, SWITCHGEAR, EXHAUST FANS, HOISTS, REDUCTION GEARS, new or reconditioned units.—Chiswick 5105, Fairlands 8279, 67 Rothschild Road, W.4. (A 19)

A. C. and D.C. MOTORS, GENERATORS from stock.—Service Electric Co. Ltd., Honeypot Lane, Stanmore, Middx. Edgware 8631-4. (A 476)

A. C. and D.C. MOTORS, GENERATORS, SWITCHGEAR, etc., always in stock. Let me have your inquiries.—G. E. Whittaker, Wellington Mill, Bolton Road, Blackburn. Tel. 7232. (A 12)

A. C. and D.C. MOTORS, all sizes, large stocks, fully guaranteed.—Milo Engineering Works Ltd., Milo Road, East Dulwich, S.E.22. (Forest Hill 2278-9.) (A 10)

All types and sizes of

Industrial Electrical Equipment

ELECTROPOWER COMPANY LIMITED
Kingsbury Works, Kingsbury Road, London N.W.9.
Telephone: COLindale 4621/2. (D 17p)

FOR ELECTRICAL MOTORS, GENERATORS, ALTERNATORS, SWITCHGEAR, please send your inquiries to Oldfield Engineering Co. Ltd., 96 East Ordsall Lane, Salford 5. (C 296)

METERS

A.C./D.C. QUARTERLY and SLOT METERS.—Brent Electrical Co., 6 Holmdale Gardens, N.W.4. (A 15)

FOR sale, 2 alternating current watt-hour METERS, 5 x 100 amps, 5 x 440 V, 50 cycles, 50 revs. per kWH, type B, No. 1535225, by Chamberlain and Hookham; 1 tachometer rev. counter, up to 800 revs. per meter, by Budenberg Gauge Co.—Charles R. Claridge and Sons Ltd., The Basin, Exeter. (S 152)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London E.C.1. (C 51)

METERS, a.c. and d.c., new and reconditioned, all types. Quarterly, single and three-phase, 3 and 4 wire, 2½ to 1,000 amps. Prepayment, single and double tariff, single, dual and triple coin, fixed and variable tariff, 2½ to 50 amps. M.D.I., billiards switches, rent collectors. Prices from 5s. Carriage paid. Guaranteed for ever. Immediate delivery.—Illustrated catalogue from The Electric Meter Co., Castor Road, Brixham. (R 360)

SWITCHGEAR

SWITCHGEAR. Sixteen unused 100-amp triple-pole oil-immersed Circuit-breakers by MAVOR AND COULSON; 400/440/3/50, fitted no-volt and three overload release trips; horiz. draw-out type on floor stands.

Ten-panel Switchboard by CROMPTON PARKINSON, Klad type, 3,300/3/50, comprising: Four 400 kVA alternator control panels fitted ammeters, kW hour meters, power factor meters and watt-hour meters; one synchronising panel fitted synchroscope, two voltmeters, synchronising plug rest and voltage transformer; five feeder panels complete with ammeters, 300-amp oil-immersed breakers, each with three overload release trips and busbar coupler. Unit complete with incoming and outgoing trifurcating boxes. Rupturing cap. 25 MVA.

Distribution Panel by PARK ENGINEERING CO., 400/3/50, comprising: One 200-amp hand op. triple-pole, air-break circuit-breaker fitted with three overload release trips with time lags and ammeters. Similar circuit-breakers for 120 amps, 75 amps, two 45 amps and one 15 amps. Panel arranged with continuous busbar chamber. Whole mounted on angle iron frame for floor fixing.

Four similar 400-amp Circuit-breakers by SWITCHGEAR AND COWANS, 11/6·6 kV, 3/50. Oil-immersed type, fitted three overload release trips, vert. isolation, mounted on floor stands and complete with trifurcating boxes. Rupturing cap., 150 MVA at 11 kV and 110 MVA at 6·6 kV.

Four-panel sheet steel non-draw-out type floor mounting Cubicle Switchboard by DRAKE AND GORHAM, rupturing cap., 100,000 kVA, comprising three 300-amp hand op. oil-immersed, triple-pole feeder switches fitted with three current transformer-operated overload release trips, time limit fuses and isolating links.

Two 300-amp floor mounting triple-pole, oil-immersed Circuit-breakers by GEORGE ELLISON, 400/3/50, each fitted no-volt, three overload release trips and ammeter scaled 0/400 amps.

Nine-unit Distribution Switchboard for 400/3/50, four-wire supply, comprising 1,500-amp hand op. triple-pole, oil-immersed circuit-breaker by GEORGE ELLISON, fitted with no-volt and three overload release trips and eight outgoing feeder switches, each 300 amps cap., by Airedale, hand op., fitted with three magnetic overload release trips and interlocked triple-pole isolators; switchboard arranged for floor mounting with continuous air-insulated busbar chamber.

Three floor mounting 1,500-amp cap. triple-pole, oil-immersed Circuit-breakers by GEORGE ELLISON, 400/3/50 supply. Oil-immersed horiz. draw-out type with busbar chambers.

George Cohen, Sons and Co. Ltd., Wood Lane, London W.12 (Tel.: Shepherds Bush 2070), and Stanningley, near Leeds (Tel.: Pudsey 2241). (S 199)

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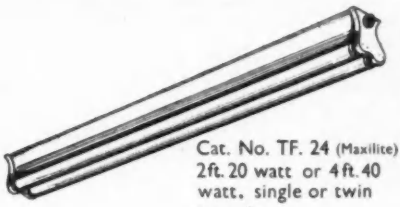

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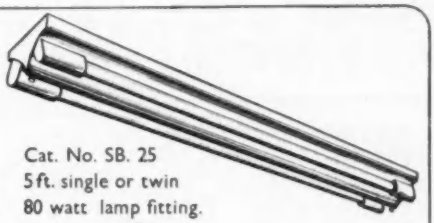

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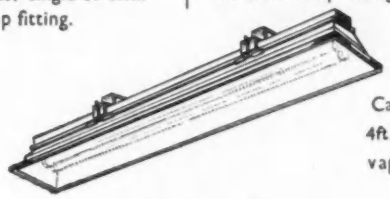

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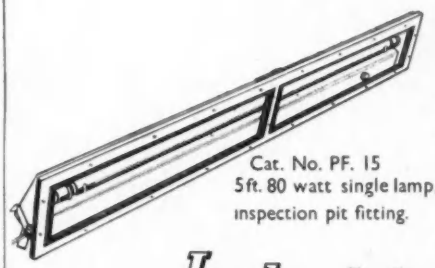

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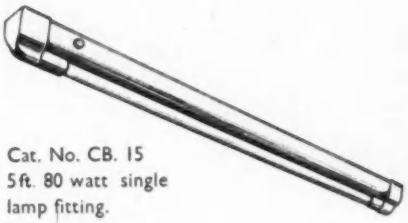

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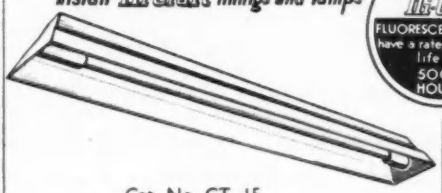

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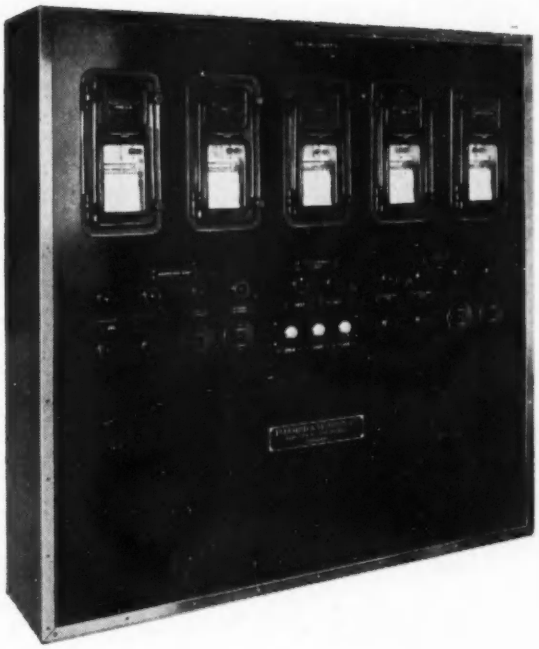

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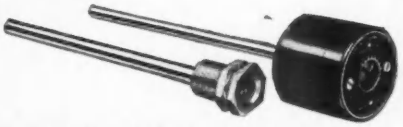

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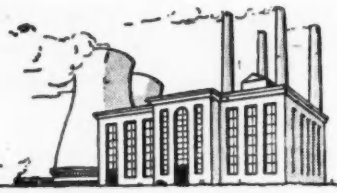

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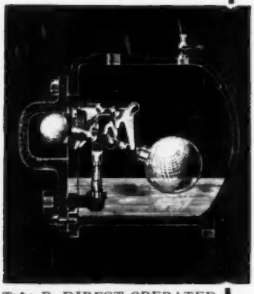

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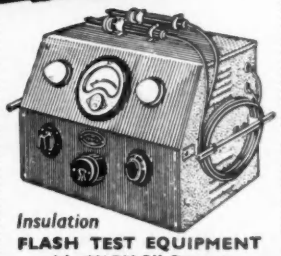

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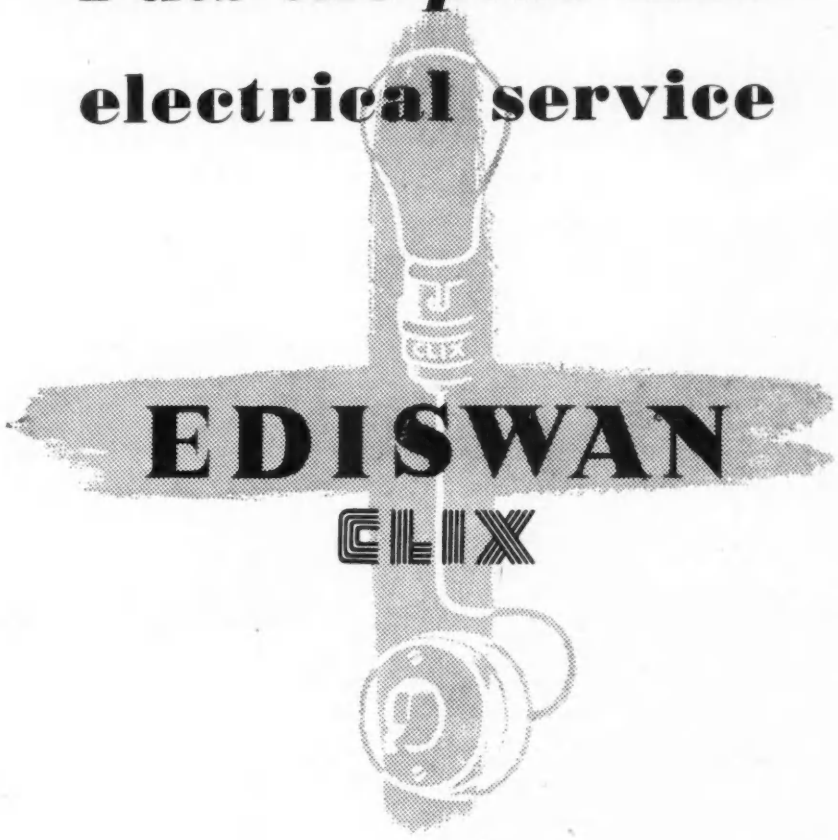

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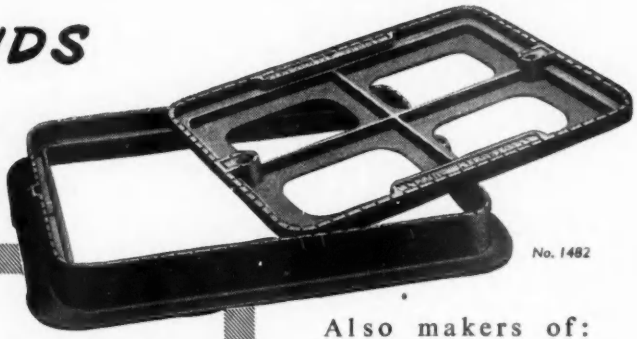

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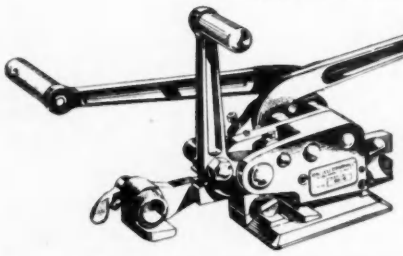

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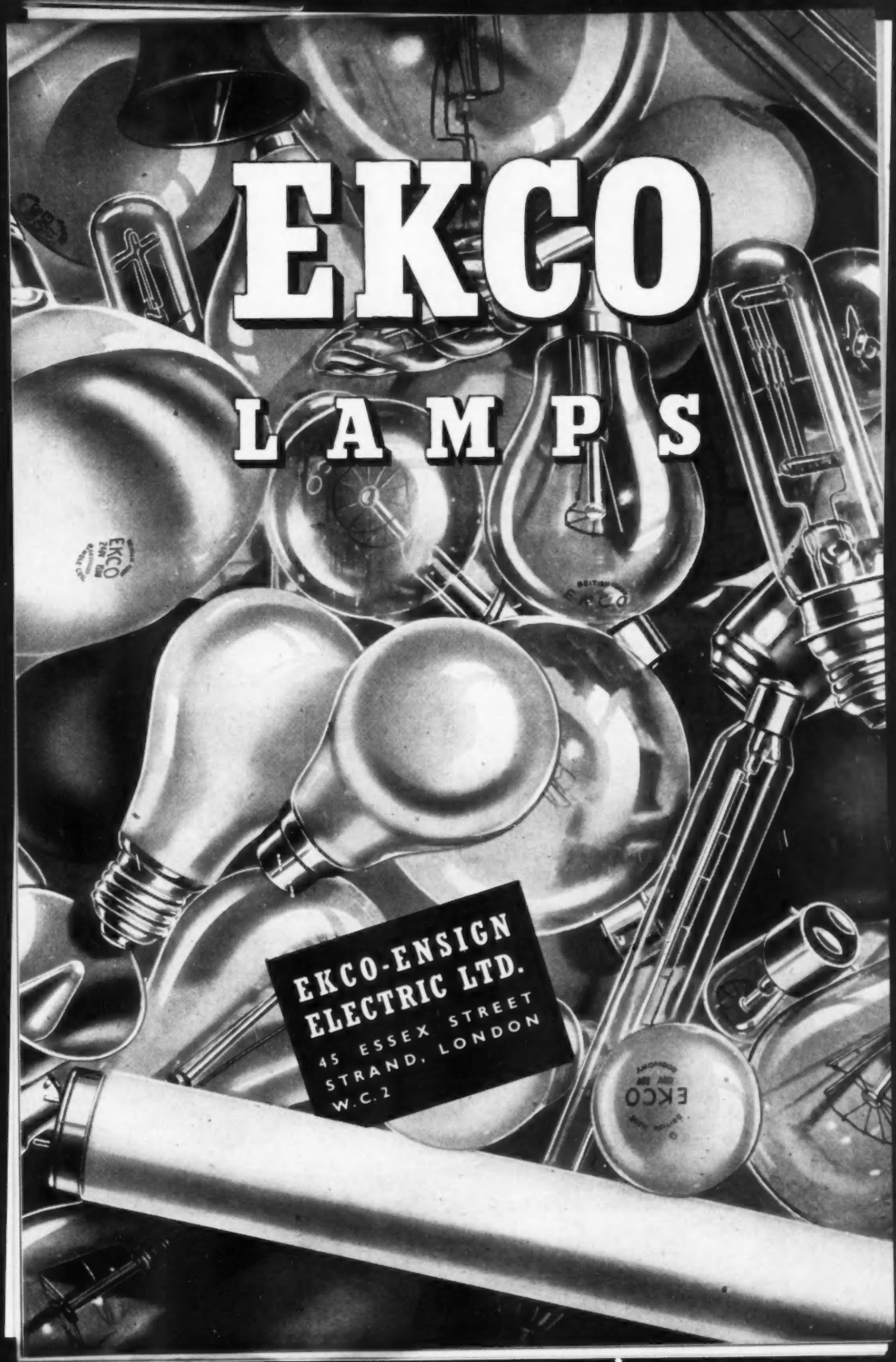
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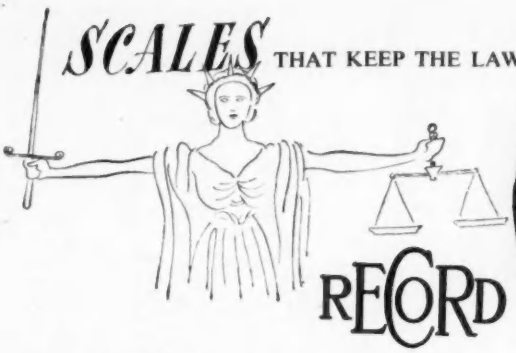

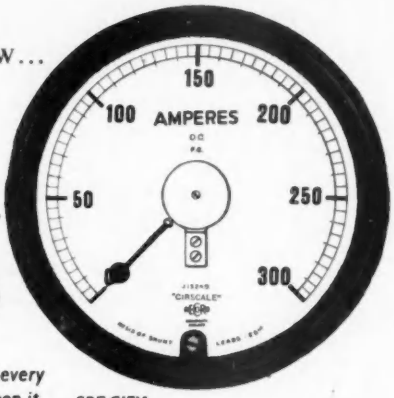

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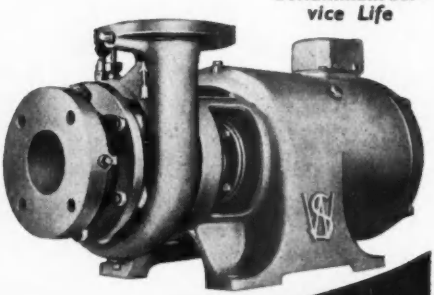

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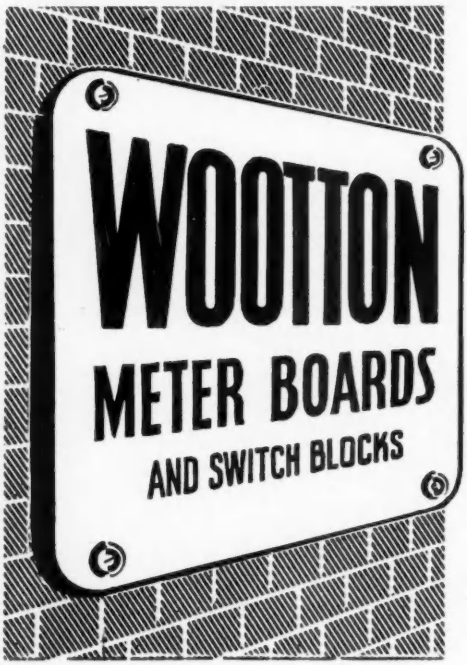

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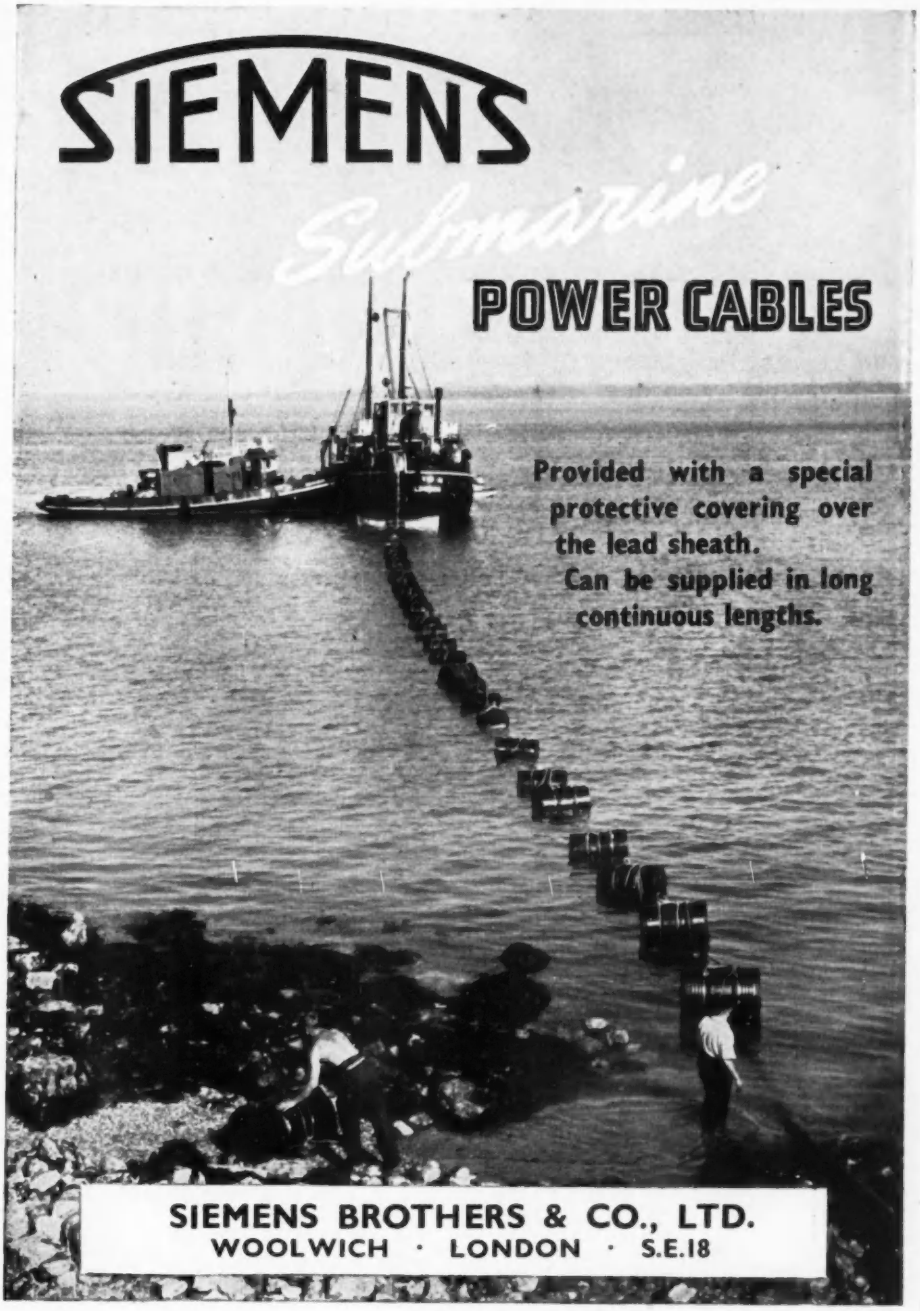
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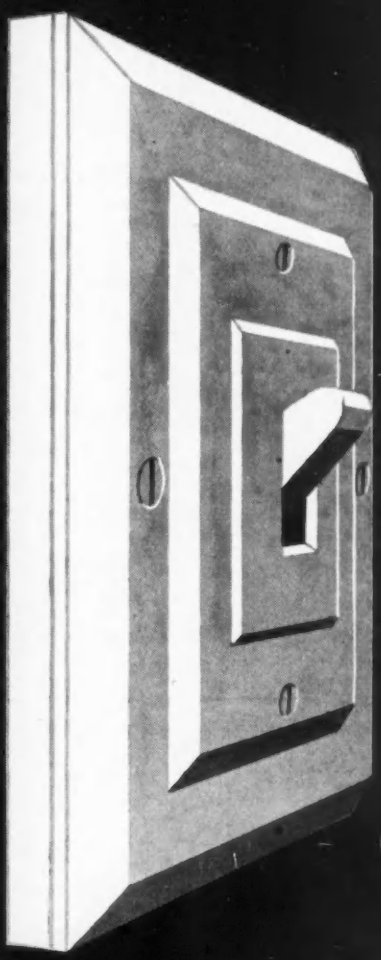

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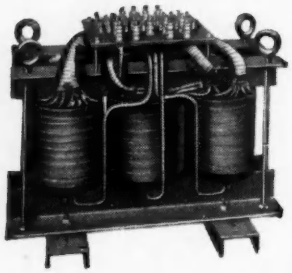

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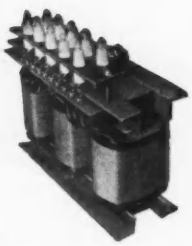

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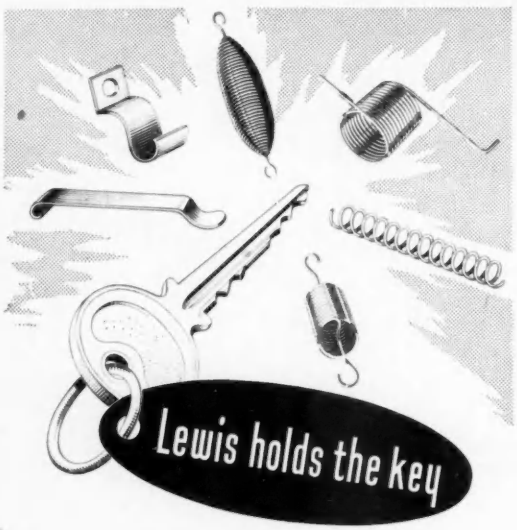

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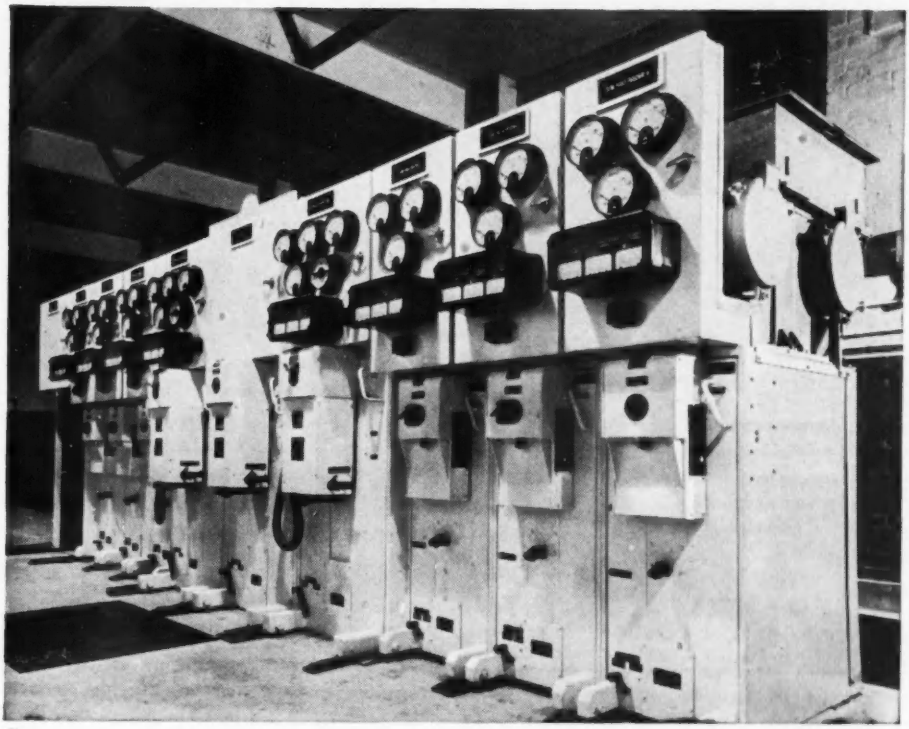

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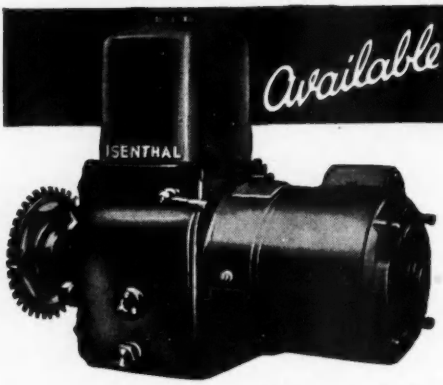

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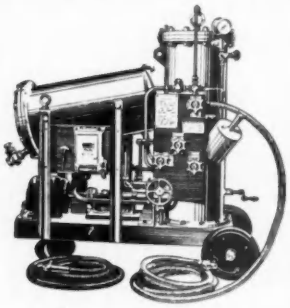

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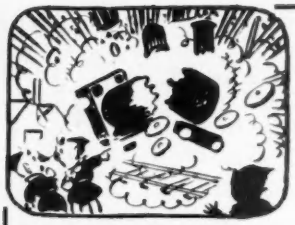

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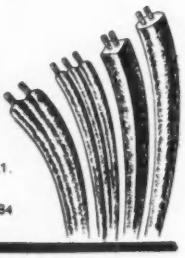

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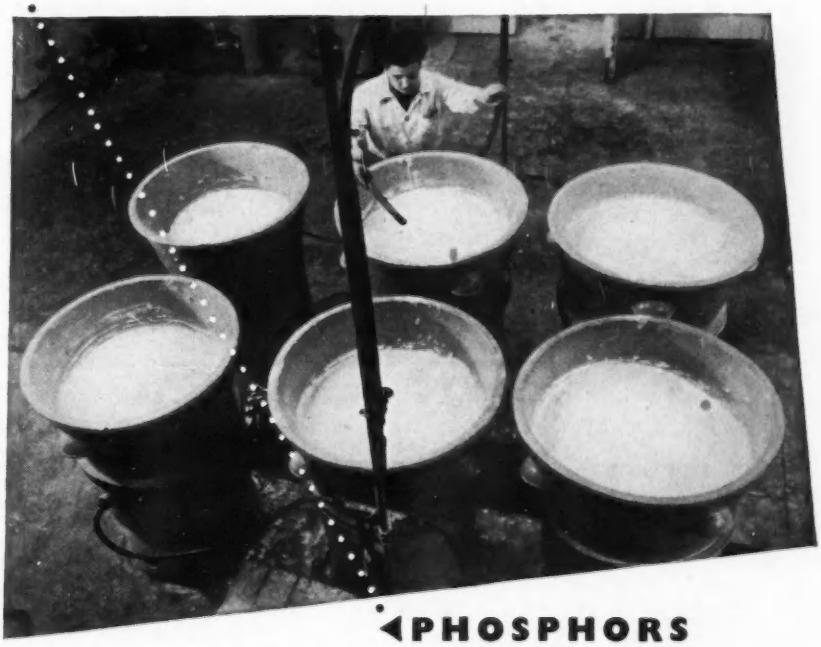

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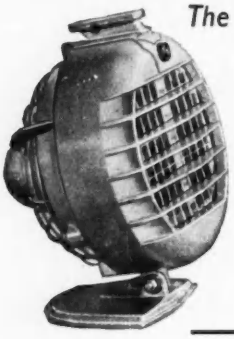

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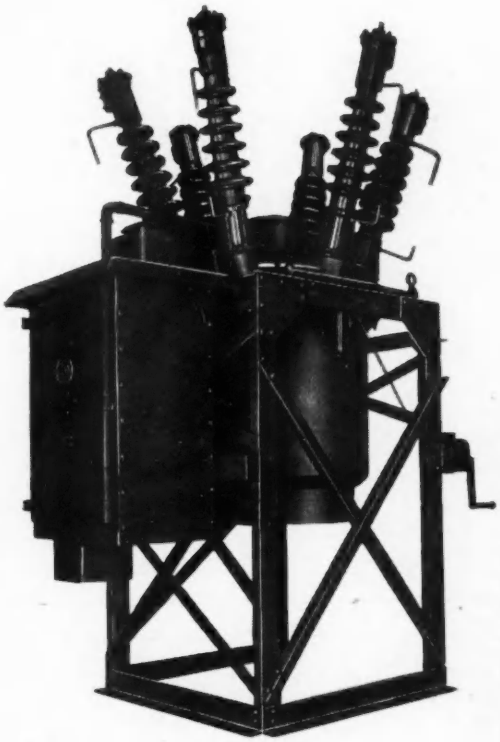

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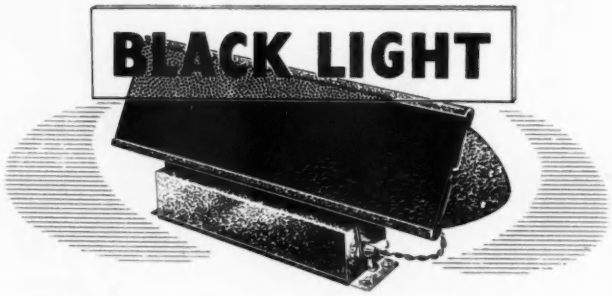

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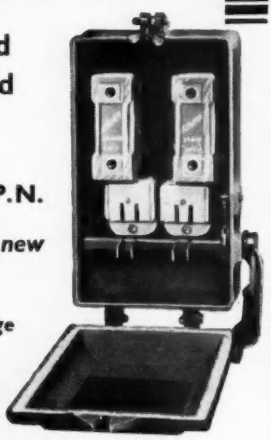

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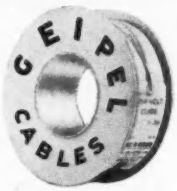

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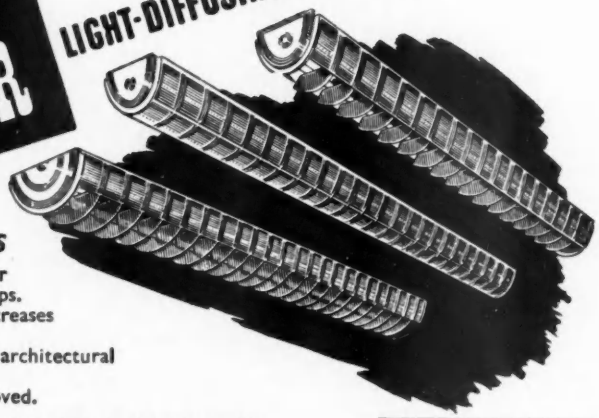

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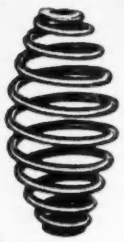

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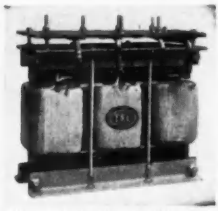

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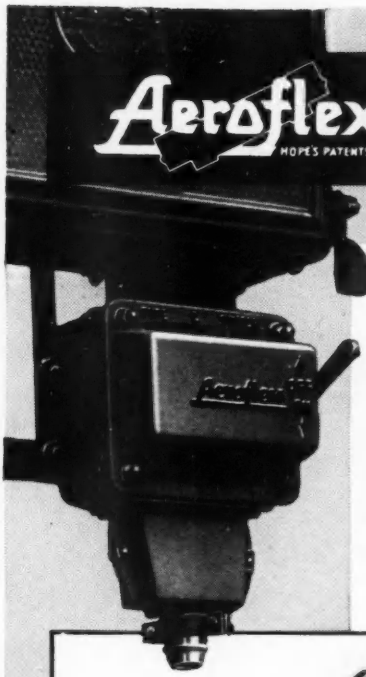

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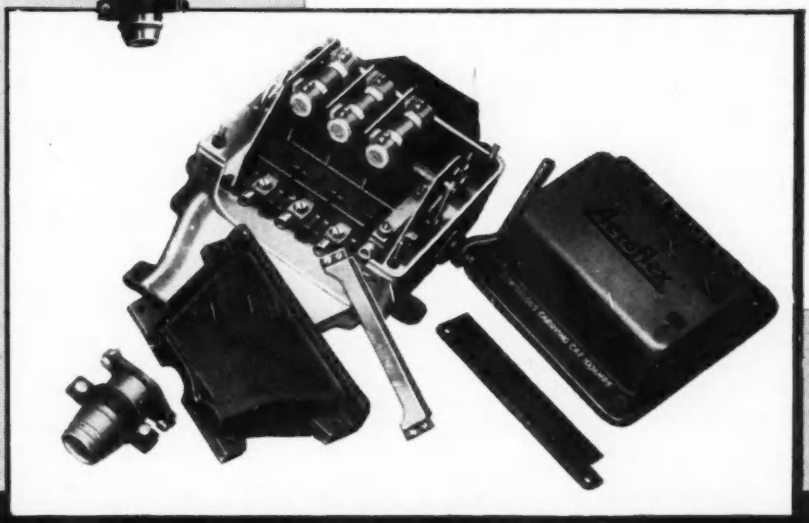

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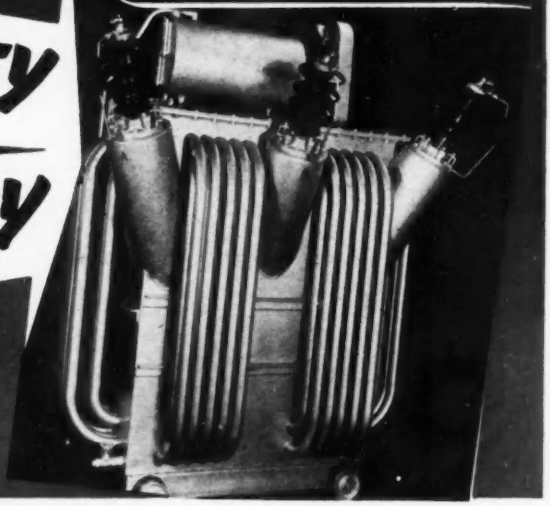

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